

Photo is TM-702A.

*Refer to parts list on page 18.

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TM-702A/E

CIRCUIT DESCRIPTION

Frequency Configuration

The TM-702A/E incorporates a PLL synthesizer that works with a digital VFO and allows channel steps of 5, 10, 12.5, 15, 20, or 25kHz to be selected.

In the 144MHz-band receiver, an incoming signal is down converted to the 1st IF of 30.300MHz (E. E2. M. M2) and 16.900MHz (K. P) using a 1st local oscillator frequency of from 113.7 to 115.7MHz (E. E2), 113.7 to 117.7MHz (M. M2) and 127.1 to 131.095MHz (K. P). The 1st IF signal is then mixed with the 2nd local oscillator frequency of 29.845MHz (E. E2. M. M2) and 17.355MHz (K. P) to produce the 2nd IF of 455kHz.

In the 430MHz-band receiver, an incoming signal is down converted to the 1st IF of 30.825MHz (E. E2. M. M2) and 21.600MHz (K. P) using a 1st local oscillator frequency of 399.175 to 409.175MHz (M. M2. E. E2) and 416.4 to 428.395MHz (K. P). The 1st IF signal is further mixed with the 2nd local oscillator frequency of 30.37MHz (E. E2. M. M2) and 21.145MHz (K. P) to produce the 2nd IF of 455kHz.

Both the 144MHz and 430MHz-band receivers are double-conversion.

The transmitter consists of a PLL circuit, which allows direct modulation and direct frequency division in both bands. Signals from the PLL circuit are amplified by a power amplifier for transmission.

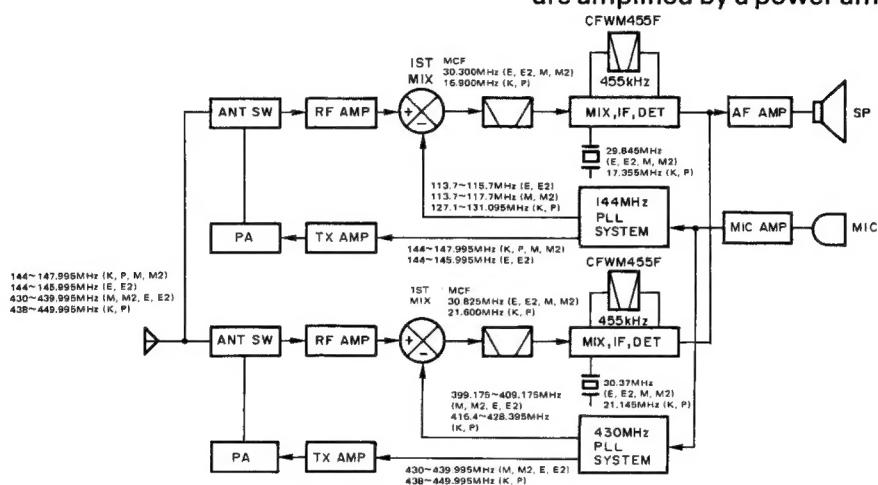


Fig. 1 Frequency Configuration

Receiving System

• General

Separate receiver circuitry is provided from the antenna connector to the 2nd IF for both bands of the TM-702A/E.

• 144MHz band

Incoming 144MHz-band signals from the antenna are passed through a low-pass filter in the final block of the transmitter system, and are then switched to the front-end of the receiver system via a transmit/receive switching diode. This signal is then passed through an antenna matching coil and amplified by a GaAs FET. Undesirable components are removed from the signal by the bandpass filter that utilizes

three varactor diodes. The resulting signal is fed to the 1st mixer, which mixes the signal with the 1st local oscillator signal in order to obtain the 1st IF of 30.3MHz (E. E2) and 16.9MHz (K. P). This signal is then passed through two monolithic crystal filters (MCFs). The signal from the MCFs is used as the 1st IF signal.

The 1st IF signal is amplified and fed into IC11 (KCD04) in the FM IF HIC (HIC=Hybrid IC). The IF signal is mixed with the 2nd local oscillator signal of 29.845MHz (M. M2. E. E2) and 17.355MHz (K. P) to produce the 2nd IF of 455kHz. The 455kHz signal is then passed through an FM ceramic filter and fed into IC11 again for amplification. The output signal from IC11 is then fed into a power amplifier via the audio volume control and sent to the speaker.

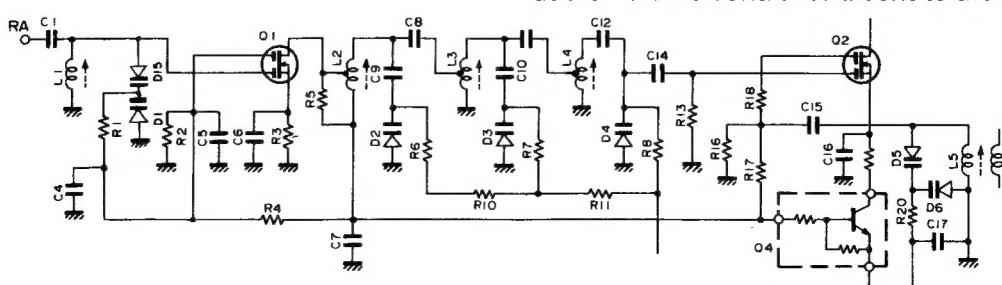


Fig. 2 144MHz front-end (varactor diode tuning)

CIRCUIT DESCRIPTION

• 430MHz band

Incoming 430MHz-band signals from the antenna are passed through a low-pass filter in the final block of the transmitter system and switched to the front-end of the receiver system via a transmit/receive switching diode. This signal is then passed through an antenna matching coil in the front-end and amplified by a GaAs FET and a junction-type FET. The signal is then fed into a two-pole helical resonator and fed into the 1st mixer. The 1st mixer combines the signal with the 1st local oscillator signal from the PLL and converts it to the 1st IF of 30.825MHz (E. E2. M. M2) and 21.6MHz (K. P).

The 1st IF signal is amplified and fed into IC3 (KCD04) in the FM IF HIC (HIC=Hybrid IC). The IF signal is mixed with the 2nd local oscillator signal of 30.37MHz (E. E2. M. M2) and 21.145MHz (K.P) to produce the 2nd IF of 455kHz. The 455kHz signal is then passed through an FM ceramic filter and fed into IC3 again for amplification. The output signal from IC3 is then fed into a power amplifier via the audio volume control and sent to the speaker.

| Item | Rating | | | |
|--------------------------|---------------------------|-------------|---------------------------|-------------|
| | E. E2. M. M2 | K. P | | |
| L71-0263-05 | L71-0294-05 | L71-0252-05 | L71-0276-05 | |
| Nominal center frequency | 30.825MHz | 30.3MHz | 21.6MHz | 16.9MHz |
| Pass band width | ±7.5kHz or more at 3dB | | | |
| Attenuation band width | ±28kHz or less at 40dB | | ±25kHz or less at 40dB | |
| Ripple | 1.5dB or less | | 1.0dB or less | |
| Insertion loss | 3dB or less | | 2dB or less | |
| Guaranteed attenuation | 60dB or more within ±1MHz | | 70dB or more within ±1MHz | |
| Terminating impedance | 1.4kΩ/1pF | 1.2kΩ/0.5pF | 1.5kΩ/1pF | 1.8kΩ/0.5pF |

Table 1 MCF (L71-0262-05, L71-0252-05)
(TX-RX unit XF1) L71-0294-05, L71-0276-05

| Item | Rating |
|---|--------------------------------|
| Nominal center frequency | 455kHz ±1kHz |
| 6dB bandwidth | ±6kHz or more (from 455kHz) |
| 50dB bandwidth | ±12.5kHz or less (from 455kHz) |
| Ripple (within ±4kHz of 455kHz) | 3dB or less |
| Insertion loss | 6dB or less |
| Guaranteed attenuation (within ±100kHz of 455kHz) | 35dB or more |
| I/O matching impedance | 2.0kΩ |

Table 2 Ceramic filter CFWM455F (L72-0372-05)

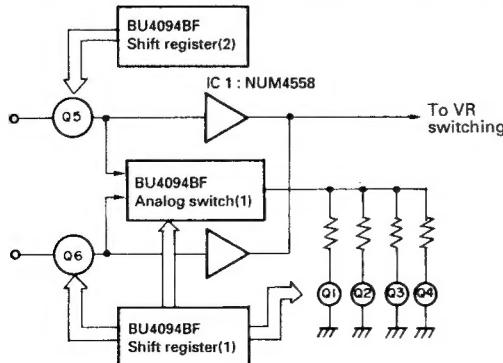


Fig. 3 (1) Main and sub switching, sub-mute switching circuit

• S-meter circuit

The S-meter control voltage from IC3 and IC11 (KCD04) in the FM IF HIC is fed into the control unit. The CPU digitizes the analog voltage to operate the LCD bar meter.

• AF section main and sub switching, sub-mute switching

The audio signal detected by the FM IF HIC is passed through AF mute Q5 and Q6 for VHF and UHF, and is output through the preamplifier.

When two signals are received at the same time, the attenuator is connected to the sub side by analog switch (1) BU4053BF, and the signals are mixed with the main output through the preamplifier, and are output. The attenuator on the sub side controls Q1 to Q4 with shift register (1) BU4094BF and is muted in 16 steps (0 to about 20dB).

• VR switching

Normally, analog switch (2) BU4053BF operates so that the audio signal output from the preamplifier can be adjusted by the VR on the panel. When a remote controller is used, shift register (2) BU4094BF operates according to the data from the CPU, analog switch (2) BU4053BF is changed over, and the electronic VR LC7532M is controlled to adjust the level.

• Shift register (1) (2)

The following control is executed by sending serial data from the CPU to the shift register (1) (2) (BU4094BF) in the electronic volume control module (X59-3800-00).

Shift register (1) Shift register (2)

| Pin No. | Pin name | Function | Pin No. | Pin name | Function |
|---------|---------------|--------------------|---------|---------------|--|
| 1 | Strobe | Enable input (ES1) | 1 | Strobe | Enable input (ES1) |
| 2 | Data | Serial data input | 2 | Data | Serial data input |
| 3 | Clock | Clock input | 3 | Clock | Clock input |
| 4 | Q1 | Sub-mute | 4 | Q1 | TX power switching: "H" in LOW mode, |
| 5 | Q2 | attenuator | 5 | Q2 | TX power switching: "H" in MID mode |
| 6 | Q3 | switching | 6 | Q3 | "H" for VHF AF MUTE |
| 7 | Q4 | | 7 | Q4 | |
| 8 | Vss | GND | 8 | Vss | GND |
| 9 | Qs | | 9 | Qs | |
| 10 | Q's | | 10 | Q's | |
| 11 | Q8 | "H" UHF AF mute | 11 | Q8 | "H" when electronic volume control is not used |
| 12 | Q7 | | 12 | Q7 | "H" when electronic volume control is used |
| 13 | UP | "H" UHF main | 13 | UP | "L" when electronic volume control is UP |
| 14 | DWN | "H" VHF main | 14 | DWN | "L" when electronic volume control is DOWN |
| 15 | Output Enable | 5V (Power) | 15 | Output Enable | 5V (Power) |
| 16 | VDD | 5V (Power) | 16 | VDD | 5V (Power) |

Table 3

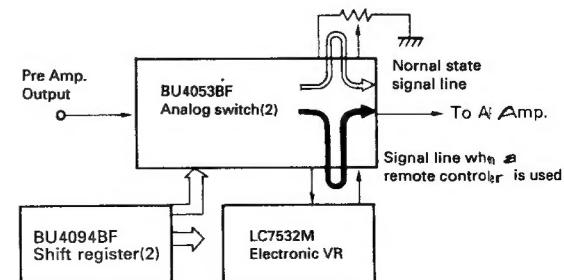


Fig. 3 (2) VR switching circuit

TM-702A/E

CIRCUIT DESCRIPTION

Transmitting System

• General

Separate circuits are provided for the 2 meter and 70 meter band, except for the mic amplifier and APC circuits.

• Modulation circuit

Audio signals from the microphone are fed into the mic amplifier for amplification, and then into two operational amplifiers. The operational amplifiers form a splatter filter and provide pre-emphasis, amplification, limiting, and removal of undesirable high-frequency components.

The modulation circuit directly frequency-modulates the VCO (Voltage Controlled Oscillator) signals for both the 144MHz and 430MHz bands using a varactor diode.

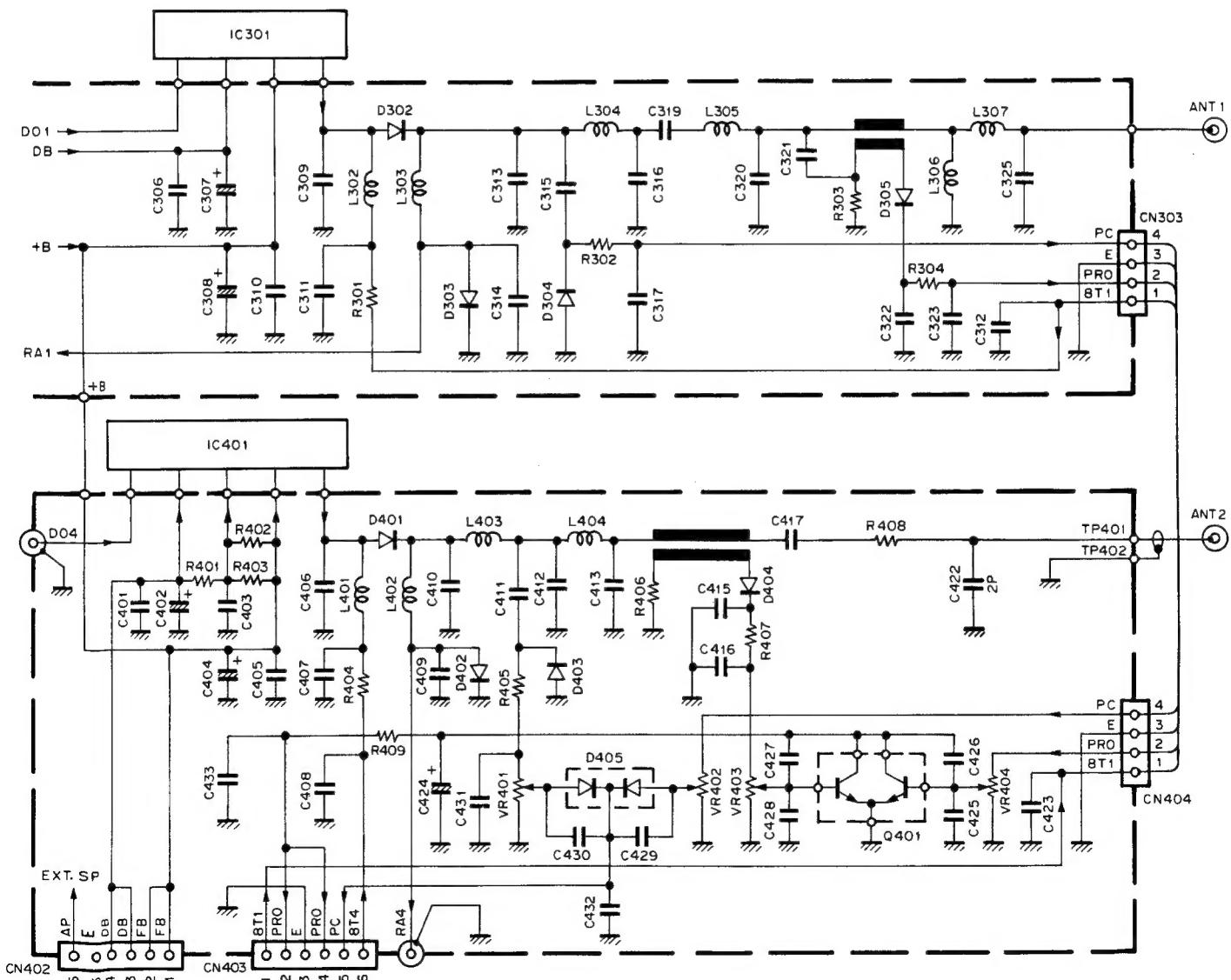
• Preamplifier circuit

The output signal from the VCO is applied to drive HIC IC9 (KCB05; two-stage linear amplifier) for the 144MHz band, and drive HIC IC10 (KCB04; three-stage linear amplifier) for the 430MHz band.

This amplifier is designed to cover a wide range of frequencies, and can produce stable output without adjustment. The APC control the collector voltage from the last stage of the amplifier.

• Power amplifier circuit

The drive signal is amplified to the required level by the power module. The signal is passed through a transmit/receive diode switch and filter, and output to the antenna.



CIRCUIT DESCRIPTION

• APC (Automatic Power Control) and SWR (Standing Wave Ratio) protection circuits

The SWR protection circuit detects any reflected power produced by a mismatch in the antenna with a CM (CM=Capacitance matching) coupler and amplifies it. This circuit reduces the output control voltage and the gain to protect the power module.

The APC circuit detects a portion of the power module output and amplifies it to obtain a control voltage for output control. Since the output control voltage is inversely proportional to the output of the power module, the output is kept constant.

The power switching circuit uses the output of the shift register (BU4094BF) in the electronic volume control module (X59-3800-00). When the LOW switch on the panel is pressed and LOW is indicated, an "H" signal is output from pin 4 of the shift register (BU4094BF); this turns Q33 of the TX-RX unit on, selecting LOW power.

When the MID switch on the panel is pressed and MID is indicated, an "H" signal is output from Pin 5 of the shift register (BU4094BF); this turns Q32 of the TX-RX unit on, selecting MID power.

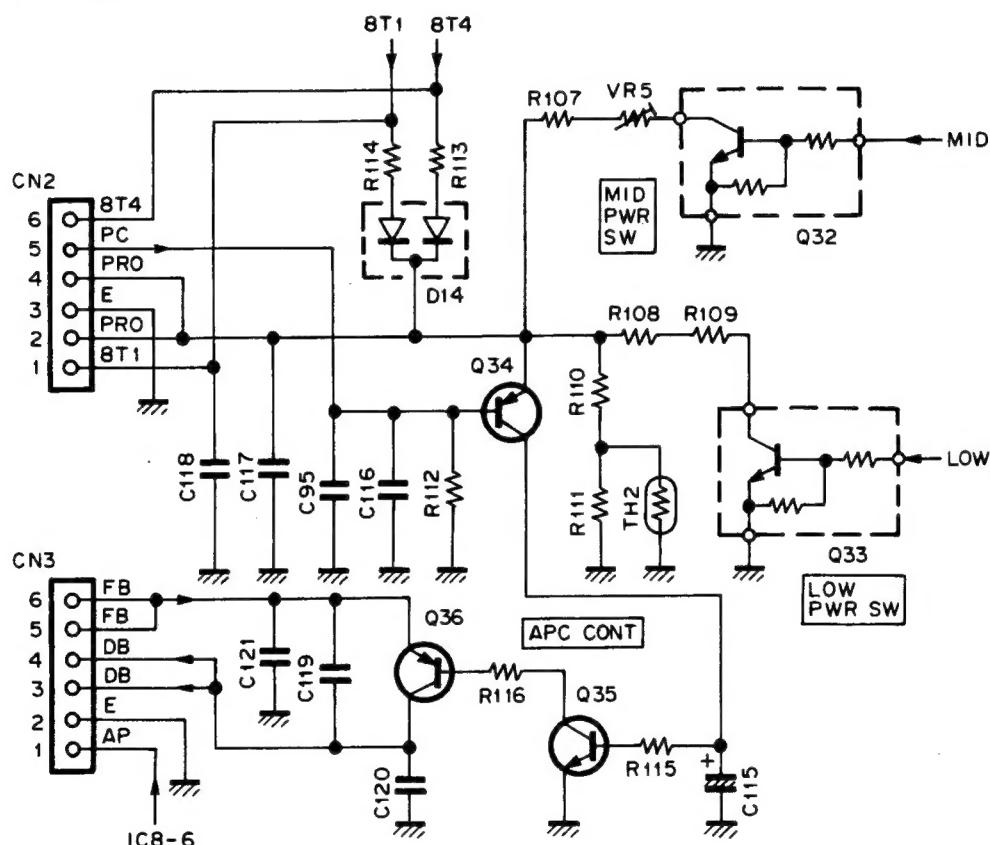


Fig. 5 LOW and MID power selection circuit

TM-702A/E

CIRCUIT DESCRIPTION

PLL Synthesizer Block

The TM-702A/E PLL system is implemented as a sub-unit divided into upper VCO and lower PLL blocks. The 144MHz-band PLL block is independent of the 430MHz-band PLL block. The sub-unit is shielded to prevent external interference.

Two reference frequencies, 6.25kHz and 5kHz, are provided in order to allow 5, 10, 12.5, 15, 20, and 25kHz step operation by dividing the reference oscillator frequency of 12.8MHz by 2048 and 2560.

The VCO directly generates the target frequency. This signal is amplified once and then fed into a

pulse-swallow PLL IC for frequency division and phase comparison.

The 144MHz-band PLL system has two VCOs, one for transmission and one for reception. Using a signal ("H" in transmit mode) from pin 10 of the PLL IC (M54959FP), the LPF is deactivated by Q105 only for the instant when the TM-702A/E enters transmit mode. This helps produce a more rapid PLL lock-up.

The 430MHz-band PLL system has a single VCO for transmission and reception. Using Q5 as a switch, it reduces the PLL lock-up time in the same way as for the 144MHz section.

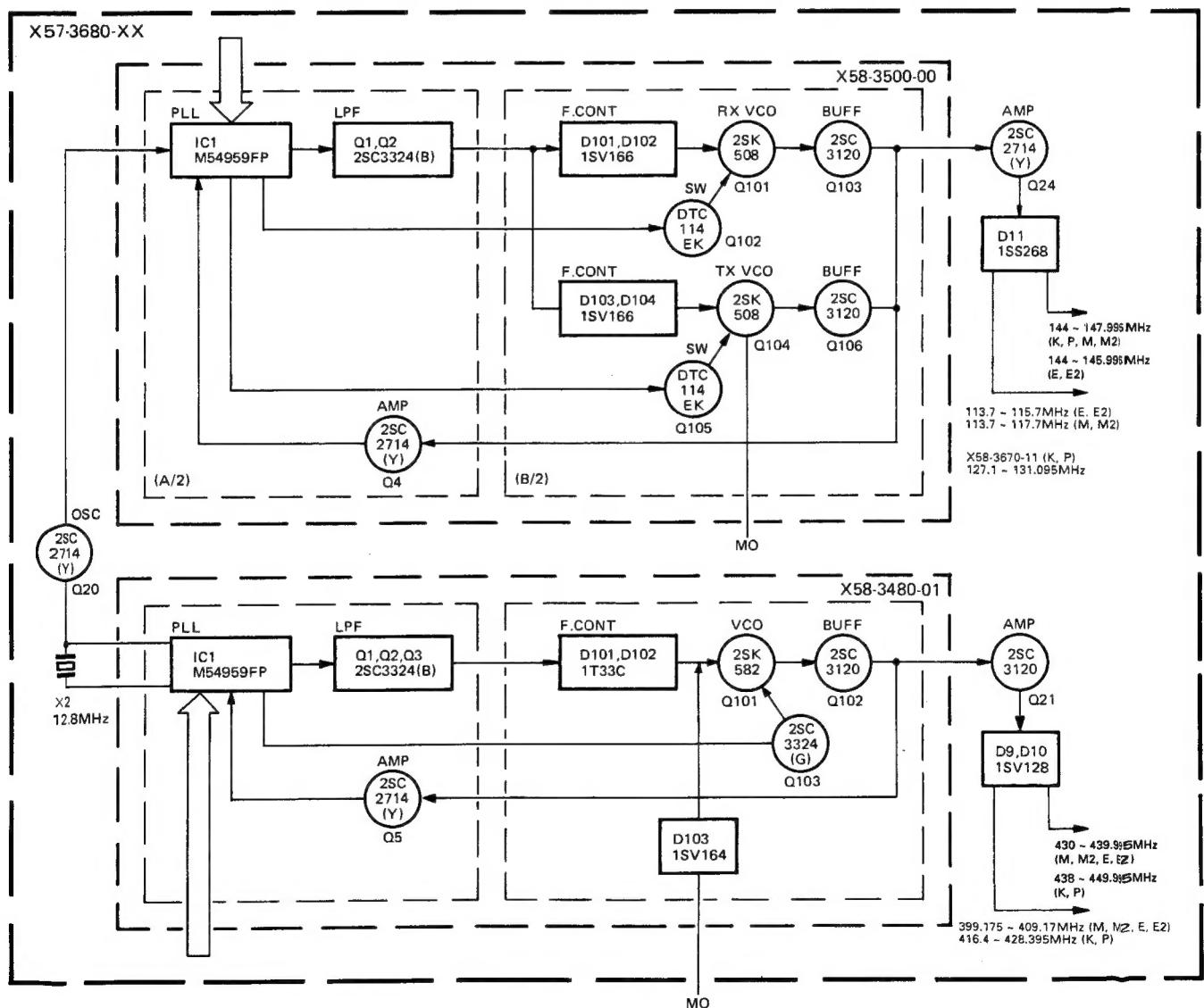


Fig. 6 PLL block diagram

CIRCUIT DESCRIPTION

• 8T (transmit 8V) switching and unlock circuits

1) 8T switching circuit

During 430MHz/144MHz transmission, T4 and T1 of IC5 in the HIC go to the "L" level (0V). As a result, Q26 and Q29 turn off, digital transistors Q27, Q30, Q28, and Q31 turn on, and 8T4 and 8T1 are supplied with 8V from the 8C line.

During receive, T4/T1 is at the "H" level (5V), and Q26 and Q29 turn on and Q27, Q30, and Q31 turn off. 8V is not supplied to 8T4 and 8T1.

2) Unlock circuit

Unlock data pin LD of the PLL sub-unit is normally at the "L" level (0V). When the 8T switching circuit operates, the transmit circuit is supplied with 8V.

When the PLL is unlocked, pin LD goes to the "H" level (5V), and Q26 and Q29 turn on. This turns Q27, Q30, Q28, and Q31 off, removing 8V from 8T4 and 8T1. Thus, no transmit signal is generated.

Digital Control Unit

• Overview

The digital control unit consists of a keyboard, a rotary encoder input, a display, a reset circuit, a back-up circuit, and a tone generator.

• Key and rotary encoder input circuits

The keys on the panel are arranged in a matrix. Key input is fed into the CPU, using a key scan technique. Output from the rotary encoder is fed directly into the CPU.

• Microphone key input circuit

The UP and DOWN keys and the other function keys for the microphone are connected directly to their corresponding analog input pins on the CPU. The function for each key is activated by a voltage produced when the corresponding key is pressed.

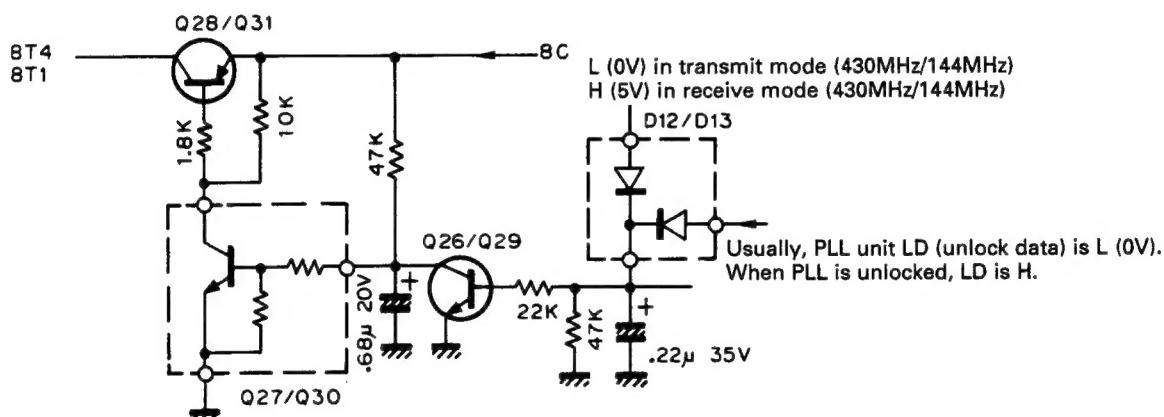


Fig. 7 8T switching and unlock circuits

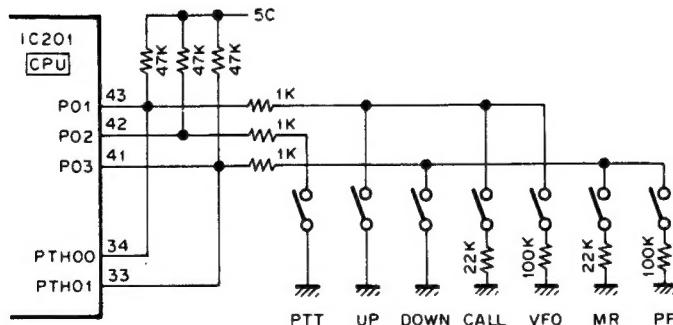


Fig. 8 Microphone key input circuit

TM-702A/E

CIRCUIT DESCRIPTION

- **Reset and back-up circuits**

When the power is turned on, the reset circuit sends an "L" level reset pulse to the RESET pin of the CPU for approx. 3ms. This initiates the power on reset sequence.

When the power is turned off, the back-up circuit detects a voltage drop in the 5C line and pulls the CPU INT4 pin to a "H" level. This causes the CPU to enter the back-up state.

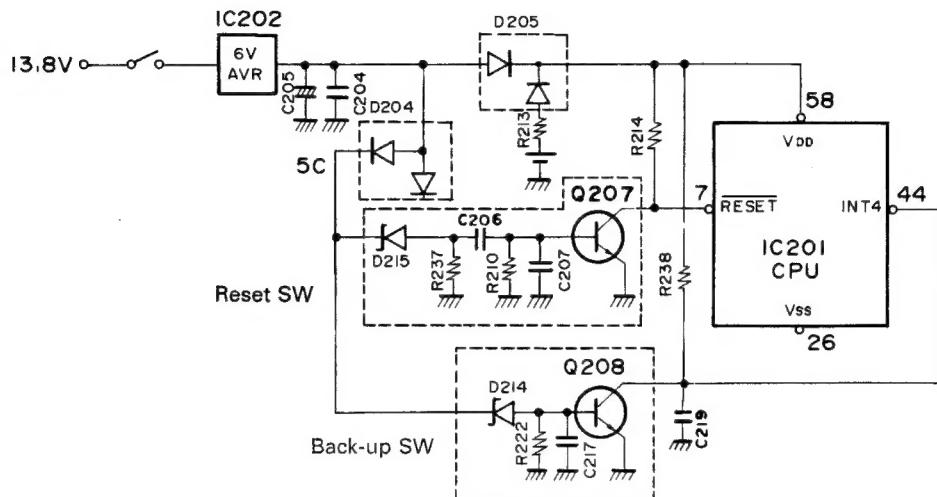


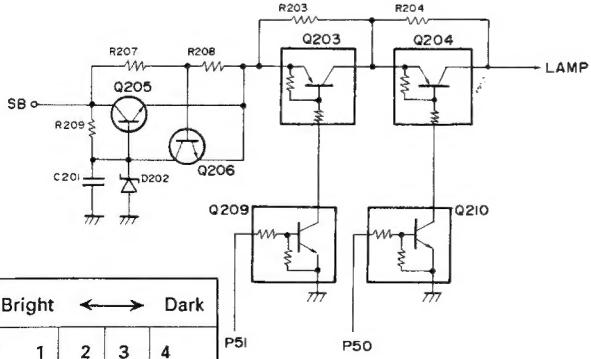
Fig. 9 Reset ad back-up circuits

- **Display circuit**

The display circuit is contained in the LCD assembly. It consists of a LCD driver, its peripheral circuits, and an LCD. The LCD is dynamically operated with a 50% duty cycle. The LCD driver receives LCD data from P33, P141, and P140 of the CPU.

- Dimmer circuit and regulated voltage circuit for lamp

The lamp circuit generates a constant voltage of about 8.8V with SB, Q205, and D202. The lamp circuit resistance is change by turning Q203 and Q204 on and off to control the dimmer. If the lamp is shorted, Q206 decreases the Q205 V_{BE} to prevent an overcurrent from following through Q205.



| Brightness | Bright \longleftrightarrow Dark | | | |
|------------|-----------------------------------|---|---|---|
| | 1 | 2 | 3 | 4 |
| P50 | H | L | H | L |
| P51 | H | H | L | L |

- Shift register circuit

The following control is executed by sending serial data from the CPU to the shift register (MB88307PF) in IC5 (KCC03).

| Pin No. | Pin name | Function |
|---------|----------|---|
| 1 | SO | |
| 2 | LOAD | Enable input |
| 3 | 00 | Normally, "H" |
| 4 | 01 | Normally, "H" |
| 5 | 02 | Normally, "H" |
| 6 | 03 | "L" in receive mode (144MHz band) |
| 7 | SC/SC | Clock input |
| 8 | Vss | GND |
| 9 | 0E | GND |
| 10 | 04 | "L" in receive mode (430MHz band) |
| 11 | 05 | "L" in receive mode, "H" in transmit mode |
| 12 | 06 | "L" in transmit mode (144MHz band) |
| 13 | 07 | "L" in transmit mode (430MHz band) |
| 14 | SI | Serial data input |
| 15 | RESET | 5V (Power) |
| 16 | Vcc | 5V (Power) |

Table 4

CIRCUIT DESCRIPTION

• Tone generator circuit

IC203 (ladder resistor network) receives analog signals from P40 thru P43 and P52 thru P53 of the CPU and digitizes them to produce 38 different tones from 67.0Hz to 250.3Hz. Figure 11 shows the internal configuration of IC203.

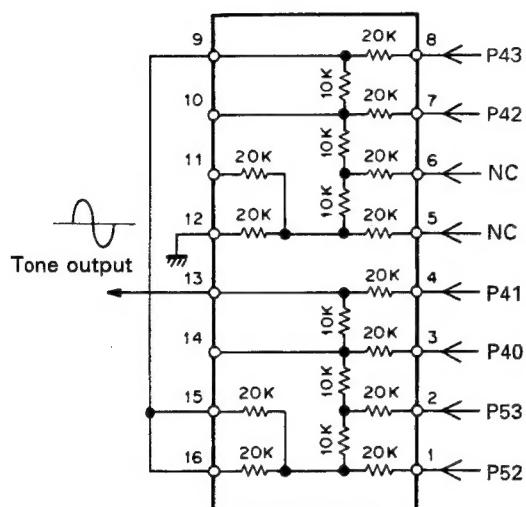


Fig. 11 Internal configuration of ladder resistor network KRR-C001 (TX-RX unit IC203)

• PLL data output

PLL data is sent from P21 (CK), P22 (DT), P62 (EP2), and P23 (EP1) of the CPU. Figure 12 is a timing chart for PLL data transfer, and Figure 13 shows the format of PLL data.

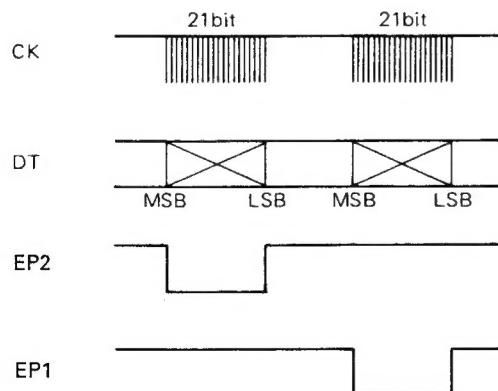
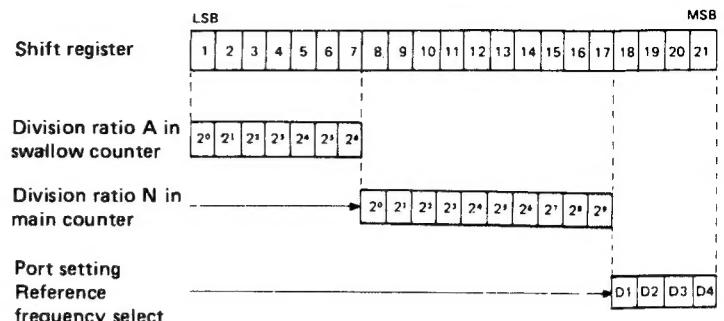


Fig. 12 Timing chart for PLL data transfer



The 21-bit data is made up of the following:

1. Division ratio data A and N (17 bits)

F (display -10.7MHz in RX mode)

$$= \{(N \times 128) + A\} \times 12.8\text{MHz/ref}$$

N: Division ratio set in 10-bit main counter (binary)

A: Division ratio set in 7-bit swallow counter (binary)

2. Reference frequency (ref) select (2 bits)

| Data | | Phase reference frequency | |
|------|----|---------------------------|--------------------------------|
| D1 | D2 | | |
| L | L | 5kHz | 5, 10, 15, 20, 25kHz step mode |
| H | L | 6.25kHz | 12.5kHz step mode |

3. Switch select (2 bits)

| Data | | Output port | | |
|------|----|-------------|-----|---------|
| D3 | D4 | SW1 | SW2 | |
| L | H | L | H | RX mode |
| H | L | H | L | TX mode |

Fig. 13 PLL data format

TM-702A/E

CIRCUIT DESCRIPTION

• Power switching circuit

The power switching circuit is an HIC that consists of a shift register (MB88307PF), 3-pin regulator (TA78L05F) that supplies 5V to the main unit, and three digital transistors.

The eight output pins of the shift register are controlled according to data from the CPU, and the power supply is switched depending on the state of the shift register.

| | 8R1 | 8R0 | 8R3 | 8R4 | T1 | 8R8 | 8RU | T4 |
|-----------------------|-----|-----|-----|-----|----|-----|-----|----|
| RX 144MHz band | H | L | L | L | H | L | H | H |
| TX 144MHz band | L | L | L | L | L | L | L | H |
| RX 430MHz band | L | L | L | H | H | L | H | H |
| TX 430MHz band | L | L | L | L | H | L | L | L |

H:8V, L:0V

Table 5

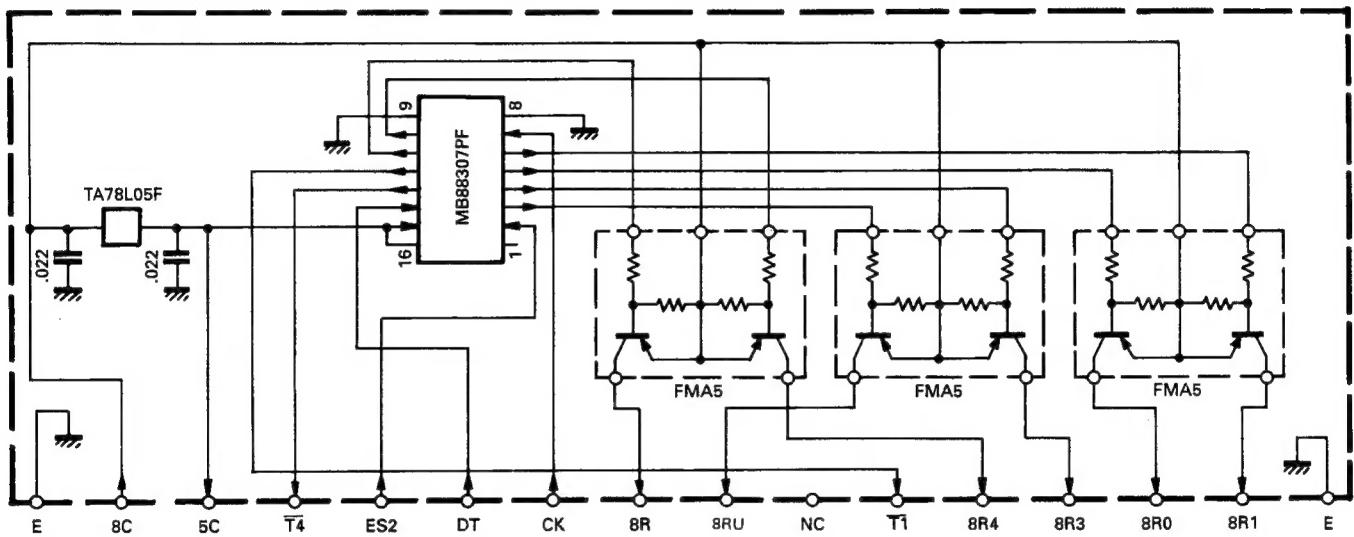


Fig. 14 Power switching circuit

• Input and output of CTCSS unit (option)

The optional CTCSS unit receives data from P21, P22, and P73 of the CPU. Figure 15 is a timing chart for CTCSS data transfer, and Figure 16 shows the format of CTCSS data. When a tone from the CTCSS unit is detected, an "H" level signal is input to T10 of the CPU, opening the squelch.

• Input and output of the remote control unit (option)

When the optional remote control unit is connected, an "H" level signal is input to INTO of the CPU, changing the function of the following pins.

P03 → S1 : Serial data input pin

P02 → S2 : Serial data output pin

P01 → SCK : Serial clock I/O pin

• Input and output of DTMF unit (option)

Data is transmitted to the DTMF unit by P60, P61, P81 and P90 through P93 of the CPU. The DTMF code is transferred by P90 through P93. When the DTMF code is read, signal is input to P60, and the code is read. When the DTMF is transmitted, data is transmitted to P90 through P93. When P61 goes high, a tone is output.

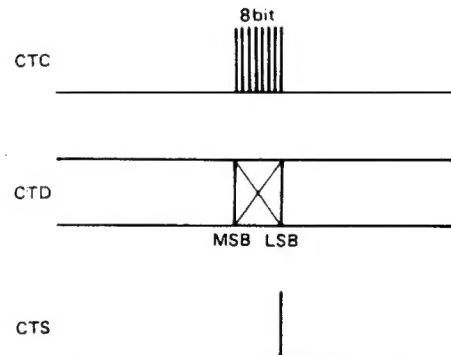


Fig. 15 Timing chart for CTCSS data transfer

Tone frequency select data for CTCSS unit

D1 D2 D3 D4 D5 D6

Example : 88.5Hz L H L H H H

Fig. 16 CTCSS data format

CIRCUIT DESCRIPTION

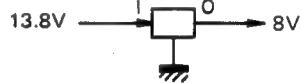
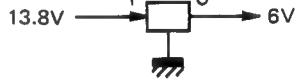
| Pin No. | Pin name | I/O | Logic | Function | Pin No. | Pin name | I/O | Logic | Function | |
|---------|----------|-----|-------|-----------------------------------|---------|----------|-----|-------|-----------------------------------|------------------------|
| 1 | P41 | O | - | D/A digital output (tone). | 33 | PTH01 | I | - | Mic DOWN input. | |
| 2 | P40 | O | - | | 34 | PTH00 | I | - | Mic UP input. | |
| 3 | P53 | O | - | | 35 | T10 | I | H | CTCSS DET | |
| 4 | P52 | O | - | | 36 | T11 | I | L | BUSY input (VHF) | |
| 5 | P51 | O | - | | 37 | P23 | O | L | PLL IC enable output. (VHF) | |
| 6 | P50 | O | - | DIMMER switch | 38 | P22 | O | - | Serial data output. | |
| 7 | RESET | I | L | | 39 | P21 | O | - | Serial clock output. | |
| 8 | X2 | - | - | 4.194304MHz crystal oscillator | 40 | P20 | O | - | Beeper output. | |
| 9 | X1 | - | - | | 41 | P03/SI | I/I | L/- | Mic DOWN/serial data input. | |
| 10 | P63 | I | - | | 42 | P02/SO | I/O | L/- | Mic PTT input/serial data output. | |
| 11 | P62 | O | H | VHF PLL enable output. EP2 | 43 | P01/SCK | I/- | L/- | Mic UP input/serial clock I/O. | |
| 12 | P61 | O | H | DTMF tone CE | 44 | INT4 | I | H | Back-up detect input. | |
| 13 | P60 | I | H | DTMF signal check DV | 45 | P123 | I | L | CALL, VFO | |
| 14 | P73 | O | H | CTCSS unit enable output. | 46 | P122 | I | L | F, MR/M | |
| 15 | P72 | O | H | Shift register enable output. ESI | 47 | P121 | I | L | SHIFT, MHz | Destination key input. |
| 16 | P71 | O | H | Shift register enable output. ES2 | 48 | P120 | I | L | TONE | |
| 17 | P70 | O | H | MIC mute | 49 | P133 | I | L | REV | |
| 18 | P83 | O | H | DTMF receiver EN | 50 | P132 | I | L | LOW, BAND | |
| 19 | P82 | O | H | Function control F.C. | 51 | P131 | I | L | Transmit power select. | |
| 20 | P81 | O | - | DTMF switch DTSEL | 52 | P130 | I | L | Busy input. (UHF) | |
| 21 | P80 | O | H | Shift register ST | 53 | P143 | O | L | Squelch control. | |
| 22 | P93 | I | H | DTSS D4 | 54 | P142 | O | H | Power switch | |
| 23 | P92 | I | H | DTSS D3 | 55 | P141 | O | - | LCD driver clock output. | |
| 24 | P91 | I | H | DTSS D2 | 56 | P140 | O | - | LCD driver data output. | |
| 25 | P90 | I | H | DTSS D1 | 57 | NC | - | H | Not used. (Connect V_{DD}) | |
| 26 | Vss | - | - | GND. | 58 | V_{DD} | - | - | Power supply pin. | |
| 27 | INT3 | I | L | Unit check | 59 | P33 | O | - | LCD driver enable output. | |
| 28 | INT2 | I | - | Encoder input. | 60 | P32 | O | L | Distination output. | |
| 29 | INT1 | I | - | | 61 | P31 | O | L | Key output. | |
| 30 | INT0 | I | H | Remote connect detect input. | 62 | P30 | O | L | | |
| 31 | PTH03 | I | - | S-meter analog input. (UHF) | 63 | P43 | O | - | D/A digital output (tone). | |
| 32 | PTH02 | I | - | S-meter analog input. (VHF) | 64 | P42 | O | - | | |

Table 6 75116GF terminal functions (TX-RX unit IC201)

TM-702A/E

DESCRIPTION OF COMPONENTS

TX-RX UNIT (X57-3680-XX) -11:TM-702A(K), -21: TM-702A(M), -22: TM-702A (M2)
 1-01: TM-702A(P), 2-71: TM-702E(E), 2-72: TM-702E(E2)

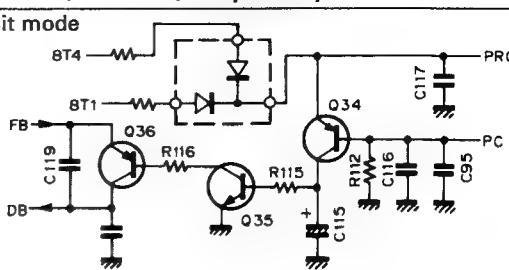
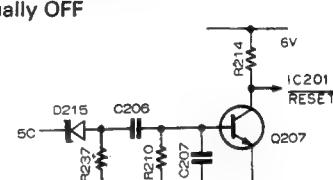
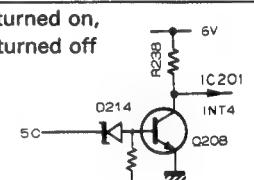
| Component | Use/Function | Operation/Condition/Compatibility |
|-------------------------|---|---|
| IC3 (UHF) IC11 (VHF) | 2nd local oscillator, mixer, IF amplifier, detector, low-frequency amplifier, noise amplifier, noise detector, squelch switch | <p>IC3</p> <p>① 1st IF signal input (30.825MHz: E. E2. M. M2, 21.6MHz: K. P) ③ ④ 2nd local oscillator (30.37MHz: E E2. M. M2, 21.145MHz: K.P) ⑨ Scan control, busy signal, busy : 0V ⑩ Noise detection voltage output (DC) ⑪ S-meter output ⑫ Detection output ⑯ RD output ⑯ AF output</p> <p>IC11</p> <p>① 1st IF signal input (30.3 MHz: E. E2 M. M2, 16.9MHz: K. P) ③ ④ 2nd local oscillator (29.845 MHz : E. E2. M. M2, 17.355MHz: K. P) ⑨ Scan control, busy signal, busy : 0V ⑩ Noise detection voltage output (DC) ⑪ S-meter output ⑫ Detection output ⑯ RD output ⑯ AF output</p> |
| IC5 | Power switching | <p>② 8V in receive mode (144MHz band) ⑤ 8V in receive mode (340MHz band) ⑥ 0V in transmit mode (144MHz band) ⑧ 8V in receive mode ⑫ 0V in transmit mode (430MHz band)</p> <p>⑬ 5V output ⑭ 8V input</p> |
| IC6 | 8V AVR | <p>3-pin regulator</p>  |
| IC7 | 10V AVR | <p>② 10V output ⑦ 13.8V input</p> |
| IC8 | AF amplification | <p>① AF input ⑥ AF output</p> |
| IC9 | 144MHz-band transmit driver | <p>Operates in transmit mode, 144 to 145.995MHz (K. P. M. M2) 144 to 147.995MHz (E. E2)</p> <p>① Output ⑪ Input</p> |
| IC10 | 430MHz-band transmit driver | <p>Operates in transmit mode, 430 to 439.995MHz (M. M2. E. E2) 438 to 449.995MHz (K. P)</p> <p>① Output ⑪ Input</p> |
| IC201 | Microprocessor | See Circuit Description |
| IC202 | 6V AVR | <p>3-pin regulator</p>  |
| IC203 | Tone A/D converter | <p>① - ⑧ Input ⑯ Output</p> |
| IC301 | Power amplification | 144MHz band M57737R |
| IC401 | Power amplification | 430MHz band M57729 |
| Q1 | High-frequency amplification | Operates in receive mode, 144MHz-band |
| Q2 | 1st mixer | Operates in receive mode |
| Q4 | Receive band switching | On in receive mode, 144MHz-band |
| Q5,6 | High-frequency amplification | Operates in receive mode, 430MHz band |
| Q7 | 1st mixer | Operates in receive mode |
| Q8 | Receive band switching | In receive mode, 430MHz band |

DISCRIPTION OF COMPONENTS

| Component | Use/Function | Operation/Condition/Compatibility |
|-----------|--------------------------------------|--|
| Q12, Q38 | 1st IF amplification | Operates in receive mode, Q12 (30.825MHz: E. E2. M. M2., 21.6MHz: K. P) Q38 (30.3MHz: E. E2. M. M2., 16.9MHz: K. P) |
| Q17, 18 | Power switch | When power switch is ON, Q17 and Q18 are ON When power switch is OFF, Q17 and Q18 are OFF |
| Q19 | PLL 8V ripple filter | |
| Q20 | Buffer amplification | 12.8MHz |
| Q21 | 430MHz band PLL output amplification | 399,175 to 409.17MHz (M. M., E. E2), 416.4~428.395MHz (K. P) in receive mode, 430 to 439.995MHz (M. M2. E. E2), 438 to 449.995MHz (K. P) in transmit mode |
| Q22 | Mic line mute | On in receive mode (430MHz band) |
| Q23 | CV line buffer | 144MHz band |
| Q24 | 144MHz band PLL output | 113.7 to 115.7MHz (M. M2), 113.7 to 117.7MHz (E. E2), 127.1~131.095MHz (K. P) in receive 144 to 145.995MHz (E. E2), 144 to 147.995MHz (K. P. M. M2) in transmit mode |
| Q25 | Mic line mute | On in receive mode, 144MHz band |
| Q26 ~ Q28 | 430MHz band 8T switching | In receive mode, Q29 : OFF Q27 and Q28 : ON |
| Q29 ~ Q31 | 144MHz band 8T switching | In receive mode, Q29 : OFF Q27 and Q31 : ON |
| Q32 | MID power switch | ON in MID power mode |
| Q33 | LOW power switch | ON in LOW power mode PRO |

TM-702A/E

DESCRIPTION OF COMPONENTS

| Component | Use/Function | Operation/Condition/Compatibility | | | | | | | | | | | | | | | |
|-------------|---|---|--------|-----|---|---|---|------|----|-----|----|-----|------|----|----|-----|-----|
| Q34 ~ 36 | APC control | Operates in transmit mode  | | | | | | | | | | | | | | | |
| Q201 ~ Q204 | Dimmer switch | Refer to circuit description on page 8. | | | | | | | | | | | | | | | |
| Q205, 206 | Required voltage circuit for lamp | Refer to circuit description on page 8. | | | | | | | | | | | | | | | |
| Q207 | Reset switch | On for approx. 3 ms when system power is turned on; usually OFF  | | | | | | | | | | | | | | | |
| Q208 | Back-up switch | On when S201 power switch is turned on, Off when S201 power switch is turned off  | | | | | | | | | | | | | | | |
| Q209, 210 | Dimmer switch control | Changed by turning Q203 and Q204 ON and OFF. <table border="1" data-bbox="1048 1144 1460 1223"> <thead> <tr> <th>DIMMER</th><th>1</th><th>2</th><th>3</th><th>4</th></tr> </thead> <tbody> <tr> <td>Q209</td><td>ON</td><td>OFF</td><td>ON</td><td>OFF</td></tr> <tr> <td>Q210</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td></tr> </tbody> </table> | DIMMER | 1 | 2 | 3 | 4 | Q209 | ON | OFF | ON | OFF | Q210 | ON | ON | OFF | OFF |
| DIMMER | 1 | 2 | 3 | 4 | | | | | | | | | | | | | |
| Q209 | ON | OFF | ON | OFF | | | | | | | | | | | | | |
| Q210 | ON | ON | OFF | OFF | | | | | | | | | | | | | |
| Q211 | Function lamp switch | ON in FUNCTION mode | | | | | | | | | | | | | | | |
| Q212 | Mic mute | ON in DTSS code and paging code output. | | | | | | | | | | | | | | | |
| Q401 | Protection switch | Adjust 430MHz with VR403, and 144MHz with VR404 | | | | | | | | | | | | | | | |
| D1 ~ 6,15 | Variable capacitance diode tuning | 144MHz band | | | | | | | | | | | | | | | |
| D7 | 430MHz band transmit/receive switch | OFF in receive mode | | | | | | | | | | | | | | | |
| D9 | 430MHz band PLL output switch | | | | | | | | | | | | | | | | |
| D10 | 430MHz band PLL output switch | | | | | | | | | | | | | | | | |
| D11 | 144MHz band PLL output switch | | | | | | | | | | | | | | | | |
| D12 ~ 14 | Reverse current prevention | | | | | | | | | | | | | | | | |
| D202 | Standard voltage | | | | | | | | | | | | | | | | |
| D203 | Dimmer switch | | | | | | | | | | | | | | | | |
| D204, 213 | Reverse current prevention | | | | | | | | | | | | | | | | |
| D205 | Reverse current prevention, lithium battery switching | Lithium battery provides power when power is off | | | | | | | | | | | | | | | |
| D206~209 | Destination setting | | | | | | | | | | | | | | | | |
| D212 | Microprocessor protection | | | | | | | | | | | | | | | | |
| D214 | Back-up detection | | | | | | | | | | | | | | | | |
| D301 | Power reverse connection prevention | | | | | | | | | | | | | | | | |
| D302 | 144MHz band transmit/receive switching | MI407 | | | | | | | | | | | | | | | |
| D303 | 144MHz band transmit/receive switching | | | | | | | | | | | | | | | | |
| D304 | 144MHz band power detection | APC, RF meter | | | | | | | | | | | | | | | |
| D305 | 144MHz band reflected wave detection | Adjust with VR404, ANT short: 4A | | | | | | | | | | | | | | | |
| D401 | 430MHz band transmit/receive switching | MI407 | | | | | | | | | | | | | | | |
| D403 | 430MHz band power detection | APC, RF meter | | | | | | | | | | | | | | | |
| D404 | 430MHz band reflected wave detection | Adjust with VR403, ANT short: 3A | | | | | | | | | | | | | | | |
| D405 | Temperature compensation | APC | | | | | | | | | | | | | | | |

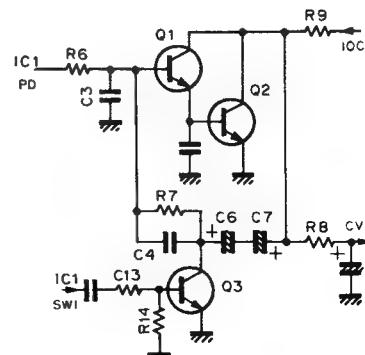
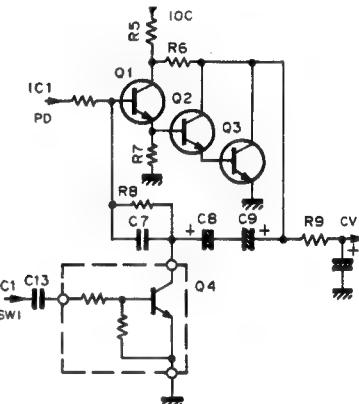
DISCRIPTION OF COMPONENTS

430PLL (X58-3480-01)

| Compornt | Use/Function | Operation/Condition/Compatibility |
|-----------|---|---|
| IC1 | PLL | ① VCO input 399.175 ~ 409.17MHz (M. M2. E. E2) 416.4 ~ 428.395MHz (K. P) in receive mode 430 ~ 439.995MHz (M. M2. E. E2) 438 ~ 449.995MHz (K. P) in transmit mode ⑩ "H" in transmit mode ⑪ "H" in transmit mode ⑫ Phase comparison output ⑬ "H" when PLL unlocked ⑭ Reference oscillation input |
| Q1 ~3 | LPF | |
| Q4 | Transmit switch | On for an instant when transmission starts |
| Q5 | VCO output amplification | 399.175 ~ 409.175MHz (M. M2. E. E2), 416.4 ~ 428.395MHz (K. P) in receive mode |
| Q101 | VCO | |
| Q102 | VCO output buffer | 430 ~ 439.995MHz (M. M2. E. E2), 438 ~ 449.995MHz (K. P) in transmit mode |
| Q103 | VCO switch | On when operated (430MHz band) |
| D1 | | |
| D101, 102 | VCO voltage control | |
| D103 | Varactor diode for modulation in Transmit mod | |

144PLL (X58-3500-00: E. E2. M. M2), (X58-3670-11: K. P)

| Compornt | Use/Function | Operation/Condition/Compatibility |
|----------|-----------------|--|
| IC1 | PLL | ① VCO input 113.7 ~ 115.7MHz (E. E2), 113.7 ~ 117.7MHz (M. M2), 127.1~131.095MHz (K. P) in reseive mode 144 ~ 145.995MHz (E. E2), 144 ~ 147.995MHz (K. P. M. M2) in transmit mode ⑩ "H" in trasmit mode ⑪ "H" in trasmit mode ⑫ Phase comparison output ⑬ "H" when PLL unlocked ⑭ Reference oscillation input |
| Q1,2 | LPF | |
| Q3 | Transmit switch | On for an instant when transmission starts |



TM-702A/E

DESCRIPTION OF COMPONENTS

| Component | Use/Function | Operation/Condition/Compatibility |
|-----------|--|---|
| Q4 | VCO output amplification | 113.7 ~ 115.7MHz (E, E2) 113.7 ~ 117.7MHz (M, M2), 127.1~131.095MHz (K, P) in receive mode 114 ~ 145.995MHz (E, E2), 144 ~ 147.995MHz (K, P, M, M2) in transmit mode |
| Q101 | Receive VCO | 113.7 ~ 115.7MHz (E, E2) 113.7 ~ 117.7MHz (M, M2), 127.1~131.095 (K, P) |
| Q102 | Receive VCO switch | On in receive mode |
| Q103 | Receive VCO output buffer | 113.7 ~ 115.7MHz (E, E2) 113.7 ~ 117.7MHz (M, M2), 127.1~131.095MHz (K, P) |
| Q104 | Transmit VCO | 144 ~ 145.995MHz (E, E2), 144 ~ 147.995MHz (K, P, M, M2) |
| Q105 | Transmit VCO switch | On in transmit mode |
| Q106 | Transmit VCO output buffer | 144 ~ 145.995MHz (E, E2), 144 ~ 147.995MHz (K, P, M, M2) |
| D101, 102 | VCO voltage control | Receive |
| D103 | VCO voltage control/varactor diode for Modulation in transmit mode | |
| D104 | VCO voltage control | Transmission |

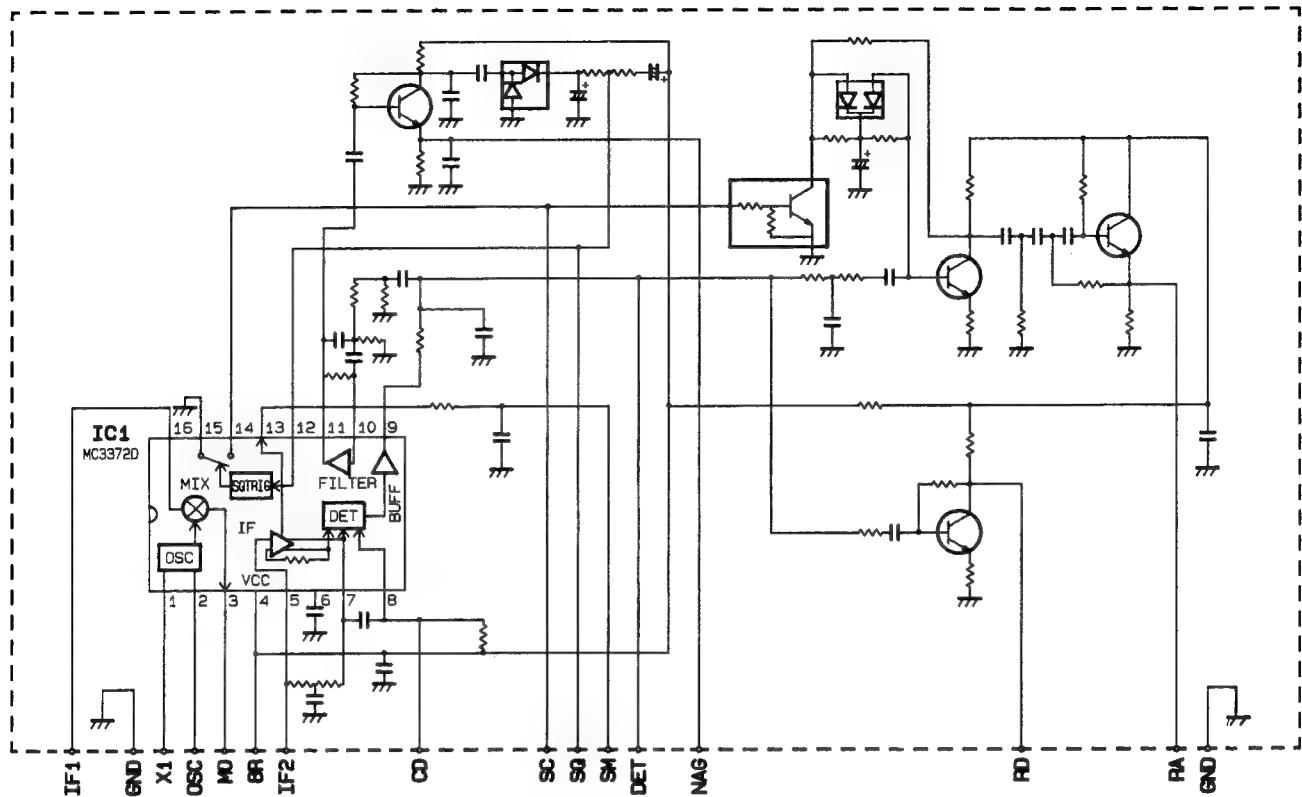
MIC AMP (X59-3610-00)

| Component | Use/Function | Operation/Condition/Compatibility |
|-----------|-----------------------------|-----------------------------------|
| IC1 (1/2) | Limited amplification | |
| IC1 (2/2) | LPF | |
| Q1 | Low-frequency amplification | |

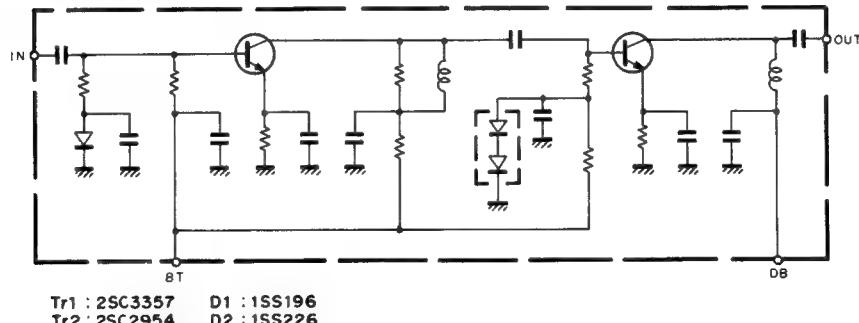
ELECTRONIC VOLUME CONTROL (X59-3800-00)

SEMICONDUCTOR DATA

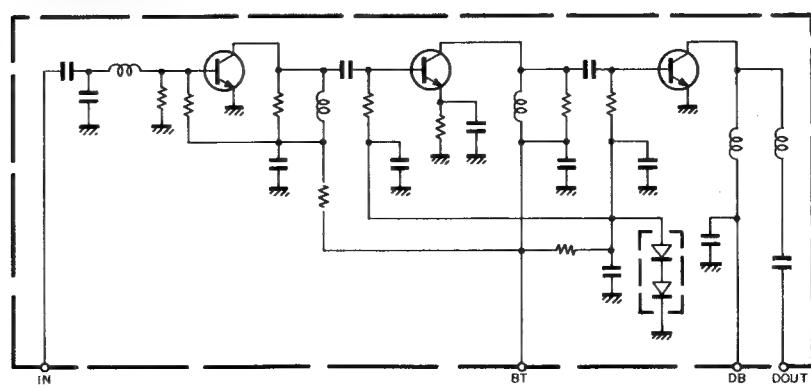
FM IF H.IC KCD04 (TX-RX UNIT IC3, 11)



H.IC KCB05 (TC-RX UNIT IC9)



H.IC KCB06 (TX-RC UNIT IC10)



TM-702A/E

PARTS LIST

* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

TM-702A/E

| Ref. No. 参照番号 | Address 位 置 | New Parts 新 | Parts No. 部品番号 | Description 部品名／規格 | Desti- nation 仕向 | Re- marks 備考 |
|------------------|----------------|-------------------|-------------------|----------------------------|------------------------|--------------------|
| TM-702A/E | | | | | | |
| 1 | 1B | * | A01-1067-23 | METALLIC CABINET(UP SIDE) | | |
| 2 | 3B | * | A01-1068-23 | METALLIC CABINET(BOTTOM) | | |
| 3 | 2B | | A10-1294-01 | CHASSIS CALKED ASSY | | |
| 4 | 2A, 2B | | A22-0770-03 | SUB PANEL | | |
| 5 | 2A, 3A | * | A62-0003-13 | PANEL ASSY | KMM2P | |
| 5 | 2A, 3A | * | A62-0009-13 | PANEL ASSY | EE2 | |
| 6 | 2A | | B11-0484-08 | FILTER(LCD ASSY) | | |
| 7 | 3A, 3B | | B30-0869-05 | LAMP | | |
| 8 | 2A, 3A | * | B38-0348-05 | LCD ASSY | | |
| 9 | 1B | | B42-2455-04 | LABEL(M4X8 MAX) | | |
| | | | B42-3322-14 | LABEL(ANT) | | |
| | | | B42-3343-04 | LABEL(MODEL) | | |
| | | | B42-3369-04 | LABEL(DC13.8V, EXT SP) | | |
| | | | B42-3394-04 | LABEL(PCC) | K | |
| | | | B46-0410-20 | WARRANTY CARD | K | |
| | | | B46-0419-00 | WARRANTY CARD | EE2 | |
| | | | B46-0422-00 | WARRANTY CARD | P | |
| | | * | B62-0002-00 | INSTRUCTION MANUAL | K | |
| | | * | B62-0003-00 | INSTRUCTION MANUAL | MM2P | |
| | | * | B62-0003-00 | INSTRUCTION MANUAL | EE2 | |
| | | * | B62-0004-00 | INSTRUCTION MANUAL | EE2 | |
| | | * | B72-0003-04 | MODEL NAME PLATE | KP | |
| | | * | B72-0004-04 | MODEL NAME PLATE | MM2 | |
| | | * | B72-0005-04 | MODEL NAME PLATE | EE2 | |
| 10 | 1B | | E23-0435-05 | TERMINAL(ANT) | | |
| | | | E30-2105-05 | ANT CABLE(M) | | |
| 11 | 2B | | E30-2106-05 | ANT CABLE(N) | EE2 | |
| 11 | 2B | | E30-2107-05 | ANT CABLE(M) | KMM2P | |
| | | | E30-2111-05 | DC CORD | | |
| 12 | 1B | * | E30-2137-15 | DC CORD | | |
| | | | E31-3346-05 | CONNECTING WIRE(SP) | | |
| | | | E31-6011-05 | CONNECTING WIRE(6P) | | |
| 13 | 1B | | F05-1031-05 | FUSE(10A) | | |
| | | | F05-2036-05 | FUSE(20A) | | |
| | | | F15-0670-04 | SHIELDING PLATE | | |
| 16 | 2B | | F20-0587-04 | INSULATING SHEET(BATT.) | | |
| 17 | 2B | | F20-1059-04 | INSULATING SHEET(BATT.) | | |
| 18 | 2B | | G02-0576-14 | FLAT SPRING | | |
| 20 | 3A | | G09-0405-05 | KNOB FIXED SPRING | | |
| 21 | 1B | | G10-0651-04 | NON-WOVEN FABRIC(SP) | | |
| 22 | 1B, 3B | | G10-0684-04 | NON-WOVEN FABRIC(130X10) | | |
| 23 | 2B | | G13-0639-04 | CUSHION(15X6X5) | | |
| 24 | 2A | | G13-0906-04 | CUSHION(3KEY) | | |
| 25 | 1A | | G13-0910-14 | CONDUCTIVE CUSHION(UPSIDE) | | |
| 26 | 2B | | G13-0926-04 | CUSHION | | |
| 27 | 3B | | G13-0932-04 | CONDUCTIVE CUSHION(BOTTOM) | | |
| 28 | 2A | | G13-0960-04 | CUSHION(6KEY) | | |
| 29 | 2B | | G13-0961-04 | CUSHION(LOW) | | |
| | | | H10-2656-02 | POLYSTYRENE FOAMED FIXTURE | | |
| | | | H11-0822-04 | POLYSTYRENE PLATE | K | |
| | | | H11-0823-04 | POLYSTYRENE PLATE | MM2P | |

E: Scandinavia & Europe

K: USA

P: Canada

W:Europe

TM-702A: K, P, M, M2

U: PX(Far East, Hawaii)

T: England

M: Other Areas

TM-702A: E, E2

UE: AAFES(Europe)

X: Australia

 indicates safety critical components.

PARTS LIST

* New Parts

Parts without Parts No. are not supplied.

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TM-702A/E

TX-RX UNIT (X57-3680-XX), (X57-3682-XX)

| Ref. No. 参照番号 | Address 位 置 | New Parts 新 | Parts No. 部品番号 | Description 部品名 / 規 格 | Desti- nation 仕 向 | Re- marks 備考 |
|------------------|----------------|-------------------|---|---|---|--------------------|
| | | | H13-0814-04 H13-0825-04 H13-0825-04 H25-0029-04 H25-0117-04 * H25-0720-04 * H25-0750-04 * H25-0750-04 * H52-0003-04 * H52-0004-04 * H52-0005-04 | PROTECTION BOARD(BRACKET) PROTECTION BOARD PROTECTION BOARD PROTECTION BAG(MIC HOOK,SCREW) PROTECTION BAG(PC CORD) PROTECTION BAG(TM-702) PROTECTION BAG(IM) PROTECTION BAG(IM) ITEM CARTON BOX ITEM CARTON BOX ITEM CARTON BOX | MM2P EE2 K MM2 EE2P KP MM2 EE2 | |
| 31 | 1B | | J20-0319-24 J21-2717-14 J21-4303-08 J29-0436-03 | MIC HOOK MOUNTING HARDWARE(SP) MOUNTING HARDWARE(LCD ASSY) BRACKET | KP | |
| 32 | 2A | | | | | |
| 33 | 2A | | K27-3035-14 | KNOB(VFO.MR.MHz) | | |
| 34 | 2B | | K27-3066-04 | KNOB(POWER) | | |
| 35 | 2B | | K27-3067-04 | KNOB(LOW) | | |
| 37 | 3A | | K27-3068-04 | KNOB(CALL) | | |
| 38 | 3A | | K27-3069-04 | KNOB(F) | | |
| 40 | 3A | | K27-3071-04 | KNOB(TONE) | | |
| 41 | 3A | | K27-3072-04 | KNOB(REV) | | |
| 42 | 3A | | K27-3073-04 | KNOB(BAND) | | |
| 39 | 3A | * | K27-3074-04 | KNOB(SHIFT) | | |
| 43 | 3A | | K29-3156-04 | KNOB(MAIN) | | |
| 44 | 3A | | K29-3157-04 | KNOB(VOL.SQL) | | |
| A | 1B, 3B | | N09-0626-04 | SCREW | | |
| B | 2B | | N09-0650-05 | SCREW | | |
| C | 1B, 3B | | N33-2606-45 | OVAL HEAD MACHINE SCREW | | |
| | | | N46-3010-46 | PAN HEAD TAPPING SCREW | | |
| D | 2B, 3B | | N87-2606-46 | BRAZIER HEAD TAPTITE SCREW | KP | |
| E | 2B | | N87-2610-46 | BRAZIER HEAD TAPTITE SCREW | | |
| F | 2A, 2B | | N88-2606-46 | FLAT HEAD TAPTITE SCREW | | |
| | | | N99-0331-05 | SCREW SET | | |
| 45 | 1B | | T07-0246-05 T91-0379-25 T91-0380-35 T91-0382-25 | LOUDSPEAKER(FULLRANGE) MICROPHONE MICROPHONE MICROPHONE | MM2 KP EE2 | |
| IC1 | | | MSM5265GSK | IC(LCD DRIVER) | | |
| IC301 | | | M57737R | IC(POWER MODULE/ 144-148MHZ) | | |
| IC401 | | | M57729 | IC(POWER MODULE) | | |
| LCD1 | | * | SLU1684 | LCD | | |
| 46 | 2B | | W01-0414-04 | WRENCH | | |
| 48 | 2A | | W09-0326-05 | LITHIUM BATTERY | | |
| | | | 490-0139-05 | COPPER LEAF TAPE | | |
| 47 | 3B | * | X57-3680-11 | TX-RX UNIT | KP | |
| 47 | 3B | * | X57-3680-21 | TX-RX UNIT | M | |
| 47 | 3B | * | X57-3680-22 | TX-RX UNIT | M2 | |
| 47 | 3B | * | X57-3682-71 | TX-RX UNIT | E | |
| 47 | 3B | * | X57-3682-72 | TX-RX UNIT | E2 | |

TX-RX UNIT (TM-702A:X57-3680-XX)-11:K, P, -21:M, -22:M2, (TM-702E:X57-3682-XX) -71:E, -72:E2

| | | | | | | |
|-------|--|---------------|--------|--------|---|--|
| C1 | | CC73FCH1H040C | CHIP C | 4PF | C | |
| C4 -7 | | CK73FB1H102K | CHIP C | 1000PF | K | |

E: Scandinavia & Europe K: USA P: Canada W: Europe

TM-702A: K, P, M, M2

TM-702E: E, E2

U: PX(Far East, Hawaii) T: England M: Other Areas

UE: AAFES(Europe) X: Australia

▲ indicates safety critical components.

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Telle ohne Parts No. werden nicht geliefert.

TM-702A/E

TX-RX UNIT (X57-3680-XX),(X57-3682-XX)

| Ref. No. | Address | New Parts | Parts No. | Description | | | Desti- nation | Re- marks |
|----------|---------|-----------|---------------|-------------|---------|------|---------------|-----------|
| 参照番号 | 位 置 | 新 | 部品番号 | 部品名 | 規 格 | | 仕 向 | 備考 |
| C8 | | | CC73FCH1H0R5C | CHIP C | 0.5PF | C | | |
| C9 ,10 | | | CC73FCH1H680J | CHIP C | 68PF | J | | |
| C11 | | | CC73FCH1H0R5C | CHIP C | 0.5PF | C | | |
| C12 | | | CC73FCH1H680J | CHIP C | 68PF | J | | |
| C13 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C14 | | | CC73FCH1H150J | CHIP C | 15PF | J | | |
| C15 | | | CC73FCH1H030C | CHIP C | 3PF | C | | |
| C16 -18 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C21 | | | CC73FCH1H040C | CHIP C | 4PF | C | | |
| C22 ,23 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C24 | | | CK73FB1H471K | CHIP C | 470PF | K | | |
| C25 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C26 | | | CK73FB1E223K | CHIP C | 0.022UF | K | | |
| C27 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C28 | | | CC73FCH1H010C | CHIP C | 1PF | C | | |
| C29 | | | CK73FB1H471K | CHIP C | 470PF | K | | |
| C30 | | | CC73FCH1H390J | CHIP C | 39PF | J | | |
| C31 ,32 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C33 | | | CC73FCH1H75C | CHIP C | 0.75PF | C | | |
| C34 | | | CC73FCH1H390J | CHIP C | 39PF | J | | |
| C35 | | | CC73FCH1H030C | CHIP C | 3PF | C | KP | |
| C35 | | | CC73FCH1H050C | CHIP C | 5PF | C | MM2 | |
| C35 | | | CC73FCH1H050C | CHIP C | 5PF | C | EE2 | |
| C36 ,37 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C38 | | | CK73FB1H471K | CHIP C | 470PF | K | | |
| C39 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C40 | | | CK73FB1H103K | CHIP C | 0.010UF | K | | |
| C41 | | | CC73FCH1H080D | CHIP C | 8PF | D | MM2EE2 | |
| C41 | | | CC73FCH1H100D | CHIP C | 10PF | D | KP | |
| C42 | | | CK73FB1H103K | CHIP C | 0.010UF | K | | |
| C43 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C44 | | | CK73EB1E104K | CHIP C | 0.10UF | K | | |
| C45 | | | CK73FB1E223K | CHIP C | 0.022UF | K | | |
| C46 | | | CE04EW1C470M | ELECTRO | 47UF | 16WV | | |
| C47 | | | CC73FCH1H120J | CHIP C | 12PF | J | MM2EE2 | |
| C47 | | | CC73FCH1H680J | CHIP C | 68PF | J | KP | |
| C48 | | | CC73FCH1H330J | CHIP C | 33PF | J | | |
| C49 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C50 | | | C92-0504-05 | CHIP TAN | 0.68UF | 20WV | | |
| C51 -53 | | | CK73EF1C105Z | CHIP C | 1.0UF | Z | | |
| C54 | | | CK73FB1H103K | CHIP C | 0.010UF | K | KP | |
| C55 | | | CK73FB1H102K | CHIP C | 1000PF | K | KP | |
| C56 ,57 | | | CK73FB1H103K | CHIP C | 0.010UF | K | KP | |
| C58 | | | CC73FSL1H101J | CHIP C | 100PF | J | KP | |
| C59 | | | CE04EW1C100M | ELECTRO | 10UF | 16WV | KP | |
| C60 | | | CK73FB1E223K | CHIP C | 0.022UF | K | KP | |
| C61 | | | CK73FB1E333K | CHIP C | 0.033UF | K | KP | |
| C62 | | | C92-0004-05 | CHIP TAN | 1.0UF | 16WV | KP | |
| C63 | | | CK73FB1H102K | CHIP C | 1000PF | K | KP | |
| C65 ,66 | | | CC73FSL1H101J | CHIP C | 100PF | J | | |
| C67 -68 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C69 ,70 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C71 | | | CK73FB1H103K | CHIP C | 0.010UF | K | | |
| C72 | | | CE04EW1A101M | ELECTRO | 100UF | 10WV | | |
| C73 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |

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TM-702E:E,E2

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▲ indicates safety critical components.

PARTS LIST

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TM-702A/E

TX-RX UNIT (X57-3680-XX),(X57-3682-XX)

| Ref. No. | Address | New Parts 新 | Parts No. | Description | | | Desti- nation 仕向 | Re- marks 備考 |
|----------|---------|----------------|---------------|-------------|---------|-------|------------------------|--------------------|
| 参照番号 | 位 置 | | 部品番号 | 部品名 | 規格 | | | |
| C74 | | | CE04EW1A221M | ELECTRO | 220UF | 10WV | | |
| C75 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C76 | | | CK73FB1H103K | CHIP C | 0.010UF | K | | |
| C77 | | | CE04EW1A221M | ELECTRO | 220UF | 10WV | | |
| C78 | | | CK73EB1E104K | CHIP C | 0.10UF | K | | |
| C79 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C80 | | | CE04EW1A221M | ELECTRO | 220UF | 10WV | | |
| C81 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C82 | | | CK73FB1E333K | CHIP C | 0.033UF | K | | |
| C83 -85 | | | CE04EW1C470M | ELECTRO | 47UF | 16WV | | |
| C86 | | | CQ92M1H154K | MYLAR | 0.15UF | K | | |
| C87 | | | CE04EW1A471M | ELECTRO | 470UF | 10WV | | |
| C88 | | | CE04EW1C101M | ELECTRO | 100UF | 16WV | | |
| C89 | | | CK73FB1H103K | CHIP C | 0.010UF | K | | |
| C90 | | | CC73FCH1H050C | CHIP C | 5PF | C | | |
| C91 | | | CK73FB1E223K | CHIP C | 0.022UF | K | | |
| C92 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C93 | | | CK73EF1C105Z | CHIP C | 1.0UF | Z | | |
| C94 | | | CK73FF1E104Z | CHIP C | 0.1UF | Z | | |
| C95 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C96 | | | CE04EW1C470M | ELECTRO | 47UF | 16WV | | |
| C97 | | | CC73FCH1H060D | CHIP C | 6PF | D | KP | |
| C98 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C99 | | | CC73FCH1H040C | CHIP C | 4PF | C | KP | |
| C99 | | | CC73FCH1H060D | CHIP C | 6PF | D | MM2EE2 | |
| C100 | | | CK73EF1C105Z | CHIP C | 1.0UF | Z | | |
| C101 | | | CK73FB1H103K | CHIP C | 0.010UF | K | | |
| C102 | | | CC73FCH1H100D | CHIP C | 10PF | D | | |
| C103 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C104 | | | CC73FCH1H270J | CHIP C | 27PF | J | | |
| C105 | | | CK73EF1C105Z | CHIP C | 1.0UF | Z | | |
| C106 | | | C92-0002-05 | CHIP TAN | 0.22UF | 35WV | | |
| C107 | | | C92-0504-05 | CHIP TAN | 0.68UF | 20WV | | |
| C108 | | | C92-0002-05 | CHIP TAN | 0.22UF | 35WV | | |
| C109 | | | C92-0504-05 | CHIP TAN | 0.68UF | 20WV | | |
| C110,111 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C112 | | | CK73EF1C105Z | CHIP C | 1.0UF | Z | | |
| C113,114 | | | CE04EW1C100M | ELECTRO | 10UF | 16WV | | |
| C115 | | | C92-0005-05 | CHIP TAN | 2.2UF | 6.3WV | | |
| C116-122 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C123 | | | C90-2092-05 | ELECTRO | 10UF | 16WV | | |
| C124 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C125,126 | | | CK73FB1H471K | CHIP C | 470PF | K | | |
| C127 | | | CC73FCH1H120J | CHIP C | 12PF | J | | |
| C128 | | | CK73FB1H103K | CHIP C | 0.010UF | K | | |
| C129 | | | CC73FCH1H070D | CHIP C | 7PF | D | | |
| C130 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C131 | | | CK73FB1H103K | CHIP C | 0.010UF | K | | |
| C132 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C133 | | | CK73EB1E104K | CHIP C | 0.10UF | K | | |
| C134 | | | CK73FB1E223K | CHIP C | 0.022UF | K | | |
| C135 | | | CE04EW1C470M | ELECTRO | 47UF | 16WV | | |
| C136 | | | CC73FSL1H330J | CHIP C | 33PF | J | KP | |
| C136 | | | CC73FSL1H470J | CHIP C | 47PF | J | MM2 | |
| C136 | | | CC73FSL1H470J | CHIP C | 47PF | J | EE2 | |

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PARTS LIST

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TM-702A/E

TX-RX UNIT (X57-3680-XX),(X57-3682-XX)

| Ref. No. 参照番号 | Address 位 置 | New Parts 新 部品番号 | Parts No. 部品番号 | Description 部品名 / 規 格 | | | Desti- nation 仕 向 | Re- marks 備考 |
|------------------|----------------|---------------------------|-------------------|--------------------------|-------|--|-------------------------|--------------------|
| C137 | | CC73FSL1H390J | CHIP C | 39PF | J | | MM2 | |
| C137 | | CC73FSL1H390J | CHIP C | 39PF | J | | EE2 | |
| C137 | | CC73FSL1H560J | CHIP C | 56PF | J | | KP | |
| C138 | | CK73EF1C105Z | CHIP C | 1.0UF | Z | | | |
| C139 | | C92-0504-05 | CHIP TAN | 0.68UF | 20WV | | | |
| C140 | | CK73EF1C105Z | CHIP C | 1.0UF | Z | | | |
| C141 | | CK73FB1H332K | CHIP C | 3300PF | K | | | |
| C142-145 | | CK73FB1H471K | CHIP C | 470PF | K | | | |
| C146,147 | | CC73FCH1H100D | CHIP C | 10PF | D | | | |
| C148,149 | | CK73FB1H471K | CHIP C | 470PF | K | | | |
| C150,151 | | CC73FCH1H070D | CHIP C | 7PF | D | | | |
| C153 | | CC73FCH1H030C | CHIP C | 3PF | C | | MM2 | EE2 |
| C153 | | CC73FCH1H030C | CHIP C | 3PF | C | | MM2 | EE2 |
| C153 | | CC73FCH1H040C | CHIP C | 4PF | C | | KP | |
| C154,155 | | CK73EF1C105Z | CHIP C | 1.0UF | Z | | | |
| C156 | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C201 | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C202 | | CK73FB1H103K | CHIP C | 0.010UF | K | | | |
| C203 | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C204 | | CK73FB1H103K | CHIP C | 0.010UF | K | | | |
| C205 | | CE04NW0J221M | ELECTRØ | 220UF | 6.3WV | | | |
| C206 | | CK73FB1E223K | CHIP C | 0.022UF | K | | | |
| C207 | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C208,209 | | CC73FCH1H330J | CHIP C | 33PF | J | | | |
| C210,211 | | CK73FB1H103K | CHIP C | 0.010UF | K | | | |
| C212-214 | | CC73FSL1H101J | CHIP C | 100PF | J | | | |
| C215-217 | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C218 | | CK73EB1E104K | CHIP C | 0.10UF | K | | | |
| C219,220 | | CK73FB1H103K | CHIP C | 0.010UF | K | | | |
| C301-303 | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C305,306 | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C307,308 | | CE04EW1C100M | ELECTRØ | 10UF | 16WV | | | |
| C309 | | CC45SL2H180J | CERAMIC | 18PF | J | | | |
| C310-312 | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C313 | | CC45SL2H220J | CERAMIC | 22PF | J | | | |
| C314 | | CC73FCH1H180J | CHIP C | 18PF | J | | | |
| C316 | | CC45SL2H330J | CERAMIC | 33PF | J | | | |
| C317 | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C319 | | CK45B2H102K | CERAMIC | 1000PF | K | | | |
| C320 | | CC45SL2H330J | CERAMIC | 33PF | J | | | |
| C321 | | CC73FCH1H020C | CHIP C | 2.0PF | C | | | |
| C322,323 | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C325 | | CC45SL2H220J | CERAMIC | 22PF | J | | | |
| C326 | | CC73FCH1H010C | CHIP C | 1PF | C | | | |
| C401 | | CK73FB1H471K | CHIP C | 470PF | K | | | |
| C402 | | CE04CW1C100M | ELECTRØ | 10UF | 16WV | | | |
| C403 | | CK73FB1H471K | CHIP C | 470PF | K | | | |
| C404 | | CE04CW1C100M | ELECTRØ | 10UF | 16WV | | | |
| C405 | | CK73FB1H471K | CHIP C | 470PF | K | | | |
| C406 | | CM73F2H080D | CHIP C | 8.0PF | D | | KP | |
| C406 | | CM73F2H090D | CHIP C | 9.0PF | D | | MM2 | |
| C406 | | CM73F2H090D | CHIP C | 9.0PF | D | | EE2 | |
| C407,408 | | CK73FB1H471K | CHIP C | 470PF | K | | | |
| C409 | | CC73FCH1H050C | CHIP C | 5PF | C | | | |
| C410 | | CC45SL2H030C | CERAMIC | 3.0PF | C | | | |

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PARTS LIST

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TM-702A/E

TX-RX UNIT (X57-3680-XX), (X57-3682-XX)

| Ref. No. 参照番号 | Address 位 置 | New Parts 新 | Parts No. 部品番号 | Description 部品名 / 規 格 | | | Desti- nation 仕 向 | Re- marks 備考 |
|------------------|----------------|-------------------|-------------------|-----------------------------|--------|-------|-------------------------|--------------------|
| C411 | | | CC73FCH1H010C | CHIP C | 1PF | C | | |
| C412 | | | CM73F2H140J | CHIP C | 14PF | J | | |
| C413 | | | CM73F2H100D | CHIP C | 10PF | D | | |
| C415, 416 | | | CK73FB1H471K | CHIP C | 470PF | K | | |
| C417 | | | CK45B2H102K | CERAMIC | 1000PF | K | | |
| C422 | | | CM73F2H020C | CHIP C | 2.0PF | C | | |
| C423 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C424 | | | C92-0507-05 | CHIP TAN | 4.7UF | 6.3WV | | |
| C425 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C426, 427 | | | CK73FB1H472K | CHIP C | 4700PF | K | | |
| C428-430 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C431 | | | CK73FB1H471K | CHIP C | 470PF | K | | |
| C432-435 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C436 | | | C92-0507-05 | CHIP TAN | 4.7UF | 6.3WV | | |
| TC1 , 2 | | | C05-0346-05 | TRIM CAP | | | | |
| TC3 | | | C05-0345-05 | TRIMMING CAP (10P) | | | | |
| CN1 | | | E04-0154-05 | RF COAXIAL CABLE RECEPTACLE | | | | |
| CN2 , 3 | | | E40-5209-05 | PIN CONNECTOR(6P) | | | | |
| CN4 | | | E04-0154-05 | RF COAXIAL CABLE RECEPTACLE | | | | |
| CN5 , 6 | | | E40-5202-05 | PIN CONNECTOR(13P) | | | | |
| CN7 | | | E40-5183-05 | PIN CONNECTOR(6P) | | | | |
| CN201, 202 | | | E40-5203-05 | PIN CONNECTOR(13P) | | | | |
| CN203 | | | E40-5185-05 | PIN CONNECTOR(8P) | | | | |
| CN204 | | | E40-5187-05 | PIN CONNECTOR(10P) | | | | |
| CN205 | | | E40-5341-05 | PIN CONNECTOR(9P) | | | | |
| CN301 | | | E40-3249-05 | PIN CONNECTOR(5P) | | | | |
| CN302 | | | E40-3246-05 | PIN CONNECTOR(2P) | | | | |
| CN303 | | | E40-3483-05 | PIN CONNECTOR(4P) | | | | |
| CN401 | | | E40-0274-05 | PIN CONNECTOR(2P) | | | | |
| CN402, 403 | | | E40-5208-05 | PIN CONNECTOR(6P) | | | | |
| CN404 | | | E40-5210-05 | PIN CONNECTOR(4P) | | | | |
| J201 | | * | E06-0860-05 | CYLINDRICAL RECEPTACLE | | | | |
| J401 | | | E11-0425-05 | PHONE JACK | | | | |
| TP1 | | | E40-0211-05 | PIN CONNECTOR(2P) | | | | |
| TP2 , 3 | | | E23-0464-05 | TERMINAL | | | | |
| TP301 | | | E23-0465-05 | TERMINAL | | | | |
| TP401, 402 | | | E23-0465-05 | TERMINAL | | | | |
| W1 | | | E31-6009-05 | CONNECTING WIRE(2P) | | | | |
| W2 | | | E31-6010-05 | CONNECTING WIRE(5P) | | | | |
| W201 | | | E31-6003-15 | CONNECTING WIRE(CTCSS) | | | | |
| W202 | | * | E33-1871-15 | FINISHED WIRE SET | | | KP | |
| W202 | | * | E33-1871-15 | FINISHED WIRE SET | | | MM2E | |
| W301 | | | E31-3350-05 | CONNECTING WIRE(FB) | | | | |
| W401 | | | E31-2066-05 | CONNECTING WIRE(D0) | | | | |
| W402 | | | E31-6013-05 | CONNECTING WIRE(RA) | | | | |
| | | | J30-0545-05 | SPACER | | | | |
| | | | J31-0534-05 | COLLAR | | | | |
| CD1 , 2 | | | L79-1013-05 | DISCRI | | | | |
| CF1 , 2 | | | L72-0372-05 | CERAMIC FILTER | | | | |
| L1 - 4 | | | L34-4080-05 | COIL | | | KP | |
| L5 | | | L34-0956-05 | COIL | | | MM2 | |
| L5 | | * | L34-4260-05 | COIL | | | | |
| L5 | | * | L34-4260-05 | COIL | | | EE2 | |

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TM-702A:K,P,M,M2

TM-702E:E,E2

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TM-702A/E

TX-RX UNIT (X57-3680-XX),(X57-3682-XX)

| Ref. No. | Address | New Parts 新 部 品 番 号 | Parts No. | Description 部 品 名 / 規 格 | Desti- nation 仕 向 | Re- marks 備 考 |
|-----------|---------|------------------------|--------------|------------------------------|-------------------------|---------------------|
| L6 | | | L40-1872-80 | SMALL FIXED INDUCTOR(18NH) | | |
| L7 | | | L40-1272-48 | SMALL FIXED INDUCTOR(12NH) | | |
| L8 , 9 | | | L79-0690-05 | HELICAL BLOCK | | |
| L10 , 11 | | | L40-1872-48 | SMALL FIXED INDUCTOR(18NH) | | |
| L12 | | | L30-0508-05 | COIL | KP | |
| L12 | | | L34-2157-05 | TUNING COIL | MM2 | |
| L12 | | | L34-2157-05 | TUNING COIL | EE2 | |
| L13 | | | L40-2772-48 | SMALL FIXED INDUCTOR(27NH) | KP | |
| L13 | | | L40-3972-48 | SMALL FIXED INDUCTOR(39NH) | MM2 | |
| L13 | | | L40-3972-48 | SMALL FIXED INDUCTOR(39NH) | EE2 | |
| L14 | | | L40-1092-81 | SMALL FIXED INDUCTOR(1UH) | MM2 | |
| L14 | | | L40-1092-81 | SMALL FIXED INDUCTOR(1UH) | EE2 | |
| L15 | | | L40-2272-48 | SMALL FIXED INDUCTOR(22NH) | | |
| L16 | | | L40-6872-80 | SMALL FIXED INDUCTOR(68NH) | | |
| L17 | | | L34-2157-05 | COIL | MM2 | |
| L17 | | | L34-2157-05 | COIL | EE2 | |
| L18 | | | L40-1092-81 | SMALL FIXED INDUCTOR(1UH) | KP | |
| L18 | | | L40-1092-81 | SMALL FIXED INDUCTOR(1UH) | MM2 | |
| L19 | | | L40-4782-48 | SMALL FIXED INDUCTOR(0.47UH) | EE2 | |
| L20 -24 | | | L40-1092-48 | SMALL FIXED INDUCTOR(1UH) | | |
| L25 | | | L40-3372-80 | SMALL FIXED INDUCTOR(33NH) | | |
| L26 | | | L40-2272-48 | SMALL FIXED INDUCTOR(22NH) | | |
| L302 | | | L34-1260-05 | COIL (10.5T) | | |
| L303 | | | L34-0895-05 | COIL (6T) | | |
| L304, 305 | | | L34-0742-05 | COIL (5T) | | |
| L306 | | | L34-1260-05 | COIL (10.5T) | | |
| L307 | | | L34-0499-05 | COIL (4T) | | |
| L401 | | | L34-1239-05 | COIL (10.5T) | | |
| L402 | | | L34-1185-05 | COIL (2.5T) | | |
| L403 | | | L34-1040-05 | COIL (1T) | | |
| L404 | | | L34-1226-05 | COIL (1.5T) | | |
| X1 | | | L77-1253-05 | CRYSTAL RESONATOR(21.145MHz) | KP | |
| X1 | | | L77-1356-05 | CRYSTAL RESONATOR(30.37MHz) | MM2 | |
| X1 | | | L77-1356-05 | CRYSTAL RESONATOR(30.37MHz) | EE2 | |
| X2 | | | L77-1405-05 | CRYSTAL RESONATOR(12.8MHz) | | |
| X3 | | | L77-1357-05 | CRYSTAL RESONATOR(17.355MHz) | KP | |
| X3 | | | L77-1444-05 | CRYSTAL RESONATOR(29.845MHz) | MM2 | |
| X3 | | | L77-1444-05 | CRYSTAL RESONATOR(29.845MHz) | EE2 | |
| X201 | | | L77-1397-05 | CRYSTAL RESONATOR(4.19MHz) | | |
| XF1 | | | L71-0252-05 | CRYSTAL FILTER(21.6MHz) | KP | |
| XF1 | | | L71-0263-05 | CRYSTAL FILTER(30.825MHz) | MM2 | |
| XF1 | | | L71-0263-05 | CRYSTAL FILTER(30.825MHz) | EE2 | |
| XF2 | | | L71-0276-05 | CRYSTAL FILTER(16.9MHz) | KP | |
| XF2 | | | L71-0294-05 | CRYSTAL FILTER(30.3MHz) | MM2 | |
| XF2 | | | L71-0294-05 | CRYSTAL FILTER(30.3MHz) | EE2 | |
| R1 | | | RK73FB2A103J | CHIP R 10K J 1/10W | | |
| R2 | | | RK73FB2A223J | CHIP R 22K J 1/10W | | |
| R3 | | | RK73FB2A101J | CHIP R 100 J 1/10W | | |
| R4 | | | RK73FB2A274J | CHIP R 270K J 1/10W | | |
| R5 -8 | | | RK73FB2A103J | CHIP R 10K J 1/10W | | |
| R9 | | | RK73FB2A101J | CHIP R 100 J 1/10W | | |
| R10 , 11 | | | R92-0670-05 | CHIP R 0 ΩHM J 1/10W | | |
| R12 | | | RK73FB2A273J | CHIP R 27K J 1/10W | KP | |

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TM-702A: K,P,M,M2

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TM-702E: E,E2

UE : AAFES(Europe)

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▲ indicates safety critical components.

PARTS LIST

* New Parts

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TM-702A/E
TX-RX UNIT (X57-3680-XX),(X57-3682-XX)

| Ref. No. | Address | New Parts 新 | Parts No. 部品番号 | Description 部品名／規格 | | | | Desti- nation 仕向 | Re- marks 備考 |
|----------|---------|----------------|-------------------|-----------------------|-------|---|-------|------------------------|--------------------|
| R13 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R14 | | | RK73FB2A273J | CHIP R | 27K | J | 1/10W | | |
| R15 | | | RK73FB2A104J | CHIP R | 100K | J | 1/10W | | |
| R16 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R17 | | | RK73FB2A274J | CHIP R | 270K | J | 1/10W | | |
| R18 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | | |
| R19 | | | RK73FB2A220J | CHIP R | 22 | J | 1/10W | KP | |
| R19 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | MM2EE2 | |
| R20 | | | RK73FB2A104J | CHIP R | 100K | J | 1/10W | | |
| R21 ,22 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R23 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | | |
| R24 | | | RK73FB2A104J | CHIP R | 100K | J | 1/10W | | |
| R25 | | | RK73FB2A333J | CHIP R | 33K | J | 1/10W | | |
| R26 ,27 | | | RK73FB2A101J | CHIP R | 100 | J | 1/10W | | |
| R28 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | | |
| R29 | | | RK73FB2A270J | CHIP R | 27 | J | 1/10W | | |
| R30 | | | RK73FB2A471J | CHIP R | 470 | J | 1/10W | | |
| R31 ,32 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R33 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |
| R34 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R35 | | | RK73FB2A221J | CHIP R | 220 | J | 1/10W | | |
| R37 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R38 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R39 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R40 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | | |
| R41 | | | RK73FB2A101J | CHIP R | 100 | J | 1/10W | | |
| R42 | | | RK73FB2A122J | CHIP R | 1.2K | J | 1/10W | | |
| R43 | | | RK73FB2A181J | CHIP R | 180 | J | 1/10W | | |
| R44 | | | RK73FB2A334J | CHIP R | 330K | J | 1/10W | | |
| R45 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R46 | | | RK73FB2A224J | CHIP R | 220K | J | 1/10W | | |
| R47 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R48 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R49 | | | RK73FB2A474J | CHIP R | 470K | J | 1/10W | | |
| R50 | | | RK73FB2A332J | CHIP R | 3.3K | J | 1/10W | KP | |
| R51 | | | RK73FB2A274J | CHIP R | 270K | J | 1/10W | KP | |
| R52 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | KP | |
| R53 | | | RK73FB2A104J | CHIP R | 100K | J | 1/10W | | |
| R54 | | | RK73FB2A681J | CHIP R | 680 | J | 1/10W | KP | |
| R55 | | | RK73FB2A272J | CHIP R | 2.7K | J | 1/10W | KP | |
| R56 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R57 ,58 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R59 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R60 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | KPMM2 | |
| R61 | | | RK73FB2A272J | CHIP R | 2.7K | J | 1/10W | | |
| R61 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | E | |
| R62 | | | RK73FB2A472J | CHIP R | 4.7K | J | 1/10W | KPMM2 | |
| R62 | | | RK73FB2A682J | CHIP R | 6.8K | J | 1/10W | E | |
| R63 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R64 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |
| R65 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R66 | | | RK73FB2A683J | CHIP R | 68K | J | 1/10W | | |
| R67 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R68 | | | RK73FB2A154J | CHIP R | 150K | J | 1/10W | | |
| R69 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |

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TM-702A:K,P,M,M2
TM-702E:E,E2

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PARTS LIST

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TM-702A/E

TX-RX UNIT (X57-3680-XX),(X57-3682-XX)

| Ref. No. | Address | New Parts 新 | Parts No. 部品番号 | Description 部品名／規格 | | | | Desti- nation 仕向 | Re- marks 備考 |
|----------|---------|----------------|-------------------|-----------------------|-------|---|-------|------------------------|--------------------|
| R70 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R71 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R72 | | | R92-1215-05 | CHIP R | 470 | J | 1/2W | | |
| R73 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R74 | | | RK73FB2A122J | CHIP R | 1.2K | J | 1/10W | | |
| R75 ,76 | | | RK73FB2A101J | CHIP R | 100 | J | 1/10W | | |
| R77 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R78 | | | RK73FB2A471J | CHIP R | 470 | J | 1/10W | | |
| R79 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | | |
| R80 | | | RK73FB2A471J | CHIP R | 470 | J | 1/10W | | |
| R81 ,83 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R82 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | | |
| R84 | | | RK73FB2A105J | CHIP R | 1.0M | J | 1/10W | | |
| R85 | | | RK73FB2A471J | CHIP R | 470 | J | 1/10W | | |
| R86 | | | RK73FB2A104J | CHIP R | 100K | J | 1/10W | | |
| R87 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | | |
| R88 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R89 | | | RK73FB2A562J | CHIP R | 5.6K | J | 1/10W | | |
| R90 | | | RK73FB2A331J | CHIP R | 330 | J | 1/10W | | |
| R91 | | | R92-1217-05 | CHIP R | 0 | | | | |
| R92 ,94 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |
| R93 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R95 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R96 | | | RK73FB2A182J | CHIP R | 1.8K | J | 1/10W | | |
| R97 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R98 ,100 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |
| R99 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R101 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R102 | | | RK73FB2A182J | CHIP R | 1.8K | J | 1/10W | | |
| R103 | | | R92-0679-05 | CHIP R | 0 ΩHM | | | | |
| R104 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R105 | | | R92-0685-05 | CHIP R | 22 | J | 1/2W | | |
| R106 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R107,108 | | | RK73FB2A472J | CHIP R | 4.7K | J | 1/10W | | |
| R109 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R110 | | | RK73FB2A273J | CHIP R | 27K | J | 1/10W | | |
| R111 | | | RK73FB2A333J | CHIP R | 33K | J | 1/10W | | |
| R112-114 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |
| R115 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R116 | | | RK73FB2A471J | CHIP R | 470 | J | 1/10W | | |
| R117 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | | |
| R118,119 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R120 | | | RK73FB2A821J | CHIP R | 820 | J | 1/10W | | |
| R121 | | | RK73FB2A5R6J | CHIP R | 5.6 | J | 1/10W | | |
| R122 | | | RK73FB2A821J | CHIP R | 820 | J | 1/10W | | |
| R123 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R124 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |
| R125 | | | RK73FB2A471J | CHIP R | 470 | J | 1/10W | | |
| R126 | | | RK73FB2A120J | CHIP R | 12 | 2 | A | | |
| R127 | | | RK73FB2A101J | CHIP R | 100 | J | 1/10W | | |
| R128 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | | |
| R129 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | MM2EE2 | |
| R129,130 | | | RK73FB2A182J | CHIP R | 1.8K | J | 1/10W | KP | |
| R130 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | MM2EE2 | |
| R131 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |

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PARTS LIST

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TM-702A/E

TX-RX UNIT (X57-3680-XX),(X57-3682-XX)

| Ref. No. 参照番号 | Address 位 置 | New Parts 新 | Parts No. 部品番号 | Description 部品名 / 規 格 | | | | Desti- nation 仕 向 | Re- marks 備考 |
|------------------|----------------|-------------------|-------------------|--------------------------|-------|---|-------|-------------------------|--------------------|
| R132,133 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R134 | | | RK73FB2A471J | CHIP R | 470 | J | 1/10W | | |
| R135 | | | RK73FB2A334J | CHIP R | 330K | J | 1/10W | | |
| R137 | | | RK73FB2A224J | CHIP R | 220K | J | 1/10W | | |
| R138 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R139 | | | RK73FB2A181J | CHIP R | 180 | J | 1/10W | | |
| R140,141 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R142,143 | | | RK73FB2A101J | CHIP R | 100 | J | 1/10W | | |
| R145 | | | RK73FB2A273J | CHIP R | 27K | J | 1/10W | | |
| R146,147 | | | RK73FB2A474J | CHIP R | 470K | J | 1/10W | | |
| R148 | | | RK73FB2A101J | CHIP R | 100 | J | 1/10W | | |
| R201 | | | RK73EB2B180J | CHIP R | 18 | J | 1/8W | | |
| R202 | | | R92-0685-05 | CHIP R | 22 | J | 1/2W | | |
| R203 | | | R92-1259-05 | FIXED RESISTOR | | | | | |
| R204 | | | R92-1262-05 | FIXED RESISTOR | | | | | |
| R205 | | | RK73FB2A472J | CHIP R | 4.7K | J | 1/10W | | |
| R206 | | | RK73EB2B220J | CHIP R | 22 | J | 1/8W | | |
| R207 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R208 | | | RK73FB2A471J | CHIP R | 470 | J | 1/10W | | |
| R209 | | | RK73FB2A561J | CHIP R | 560 | J | 1/10W | | |
| R210 | | | RK73FB2A563J | CHIP R | 56K | J | 1/10W | | |
| R211 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R213 | | | RK73FB2A472J | CHIP R | 4.7K | J | 1/10W | | |
| R214 | | | RK73FB2A474J | CHIP R | 470K | J | 1/10W | | |
| R215 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R216,217 | | | RK73FB2A472J | CHIP R | 4.7K | J | 1/10W | | |
| R218 | | | RK73FB2A105J | CHIP R | 1.0M | J | 1/10W | | |
| R219 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R222 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R223-225 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R226-229 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R230 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R231-234 | | | RK73FB2A104J | CHIP R | 100K | J | 1/10W | | |
| R233 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R235 | | | RK73FB2A474J | CHIP R | 470K | J | 1/10W | | |
| R236,237 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R238 | | | RK73FB2A474J | CHIP R | 470K | J | 1/10W | | |
| R239 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | | |
| R240 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R241 | | | RK73FB2A472J | CHIP R | 4.7K | J | 1/10W | | |
| R242 | | | RK73FB2A104J | CHIP R | 100K | J | 1/10W | | |
| R243 | | | RK73FB2A474J | CHIP R | 470K | J | 1/10W | | |
| R244 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R245 | | | RK73FB2A152J | CHIP R | 1.5K | J | 1/10W | | |
| R301 | | | R92-1214-05 | CHIP R | 120 | J | 1/2W | | |
| R302 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |
| R303 | | | RK73FB2A220J | CHIP R | 22 | J | 1/10W | | |
| R304 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R402,403 | | | R92-0670-05 | CHIP R | 0 ΩHM | | | | |
| R404 | | | R92-1214-05 | CHIP R | 120 | J | 1/2W | | |
| R405 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R406 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | | |
| R407 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R408 | | | R92-0679-05 | CHIP R | 0 ΩHM | | | | |
| R409 | | | RK73FB2A270J | CHIP R | 27 | J | 1/10W | | |

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PARTS LIST

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TM-702A/E

TX-RX UNIT (X57-3680-XX),(X57-3682-XX)

| Ref. No. 参照番号 | Address 位 置 | New Parts 新 部品番号 | Parts No. 部品番号 | Description 部品名 / 規 格 | Desti- nation 仕 向 | Re- marks 備考 |
|------------------|----------------|---------------------------|-------------------|------------------------------|-------------------------|--------------------|
| R410 | | | R92-0150-05 | JUMPER REST 0 ΩHM | | |
| VR1 | | | R12-6431-05 | TRIM POT. 220K | | |
| VR2 ,3 | | | R12-6452-05 | TRIMMING POT.100K | | |
| VR4 ,5 | | | R12-6427-05 | TRIM POT. 47K | | |
| VR7 | | | R12-6452-05 | TRIMMING POT.100K | | |
| VR8 | | | R12-6427-05 | TRIM POT. 47K | | |
| VR201 | | | R05-3441-05 | POTENTIOMETER10KA | | |
| VR202 | | | R05-4420-05 | POTENTIOMETER50KB | | |
| VR401 | | | R12-6450-05 | TRIMMING POT.47K | | |
| VR402-404 | | | R12-6427-05 | TRIM POT. 47K | | |
| S201 | | | S40-2458-05 | PUSH SWITCH | | |
| S202-211 | | | S40-1086-05 | TAKT SWITCH | | |
| D1 -4 | | | 1SV164 | DIODE | | |
| D5 | | | 1SV164 | DIODE | KP | |
| D5 | | | 1SV166 | DIODE | MM2EE2 | |
| D6 | | | 1SV166 | DIODE | | |
| D7 | | | HSK277 | DIODE | | |
| D9 ,10 | | | 1SV128 | DIODE | | |
| D11 | | | 1SS268 | DIODE | | |
| D12 -14 | | | 1SS184 | DIODE | | |
| D15 | | | 1SV164 | DIODE | | |
| D202 | | | 02CZ9.1(Y) | ZENER DIODE | | |
| D203 | | | 1SS184 | DIODE | | |
| D204 | | | 1SS181 | DIODE | KPME | |
| D205 | | | 1SS184 | DIODE | MM2EE2 | |
| D206 | | | 1SS184 | DIODE | | |
| D207 | | | 1SS184 | DIODE | | |
| D208 | | | 1SS184 | DIODE | MM2 | |
| D208 | | | 1SS184 | DIODE | KP | |
| D209 | | | MA141A | DIODE | MM2 | |
| D209 | | | MA141A | DIODE | EE2 | |
| D212 | | | 1SS226 | DIODE | | |
| D213 | | | LFB01 | DIODE | | |
| D214 | | | 02CZ5.1(X) | ZENER DIODE | | |
| D215 | | | 02CZ3.0(Z) | ZENER DIODE | | |
| D216 | | | B30-0852-05 | LED | | |
| D301 | | | DSA3A1 | DIODE | | |
| D302 | | | MI407 | DIODE | | |
| D303 | | | MI308 | DIODE | | |
| D304 | | | 1SS101 | DIODE | | |
| D305 | | | 1SS184 | DIODE | | |
| D401 | | | MI407 | DIODE | | |
| D402 | | | MI308 | DIODE | | |
| D403 | | | 1SS101 | DIODE | | |
| D404 | | | MA716 | DIODE | | |
| D405 | | | 1SS184 | DIODE | | |
| IC3 | | | KCD04 | H.IC | | |
| IC4 | | | TA7787AF | IC(FM/AM 1F/3V) | KP | |
| IC5 | | | KCC03 | H.IC | | |
| IC6 | | | UPC78M08H | IC(VOLTAGE REGULATOR/ +8V) | | |
| IC7 | | | LA5010M | IC(LOW SATURATION REGULATOR) | | |
| IC8 | | | UPC1241H | IC | | |
| IC9 | | | KCB05 | H.IC | | |
| IC10 | | | KCB06 | H.IC | | |

E: Scandinavia & Europe K: USA

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TM-702A:K,P,M,M2

U: PX(Far East, Hawaii) T: England M: Other Areas

TM-702E:E,E2

UE: AAFES(Europe)

X: Australia

⚠ indicates safety critical components.

PARTS LIST

* New Parts

Parts without Parts No. are not supplied.

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Telle ohne Parts No. werden nicht geliefert.

TM-702A/E

TX-RX UNIT (X57-3680-XX),(X57-3682-XX)

| Ref. No. | Address | New Parts 新 | Parts No. 部品番号 | Description 部品名／規格 | Desti- nation 仕向 | Re- marks 備考 |
|----------|---------|----------------|-----------------------|----------------------------|------------------------|--------------------|
| IC11 | | | KCD04 | H.IC | | |
| IC12 | | | BU4053BF | H.IC | | |
| IC201 | | * | 75116GF-667-3BE | IC(MICROPROCESSOR) | | |
| IC202 | | | NJM78L06UA | IC(VOLTAGE REGULATOR/ +6V) | | |
| IC203 | | | R90-0711-05 | CHIP R NETWORK | | |
| Q1 | | | 3SK184(S) | FET | | |
| Q2 | | | 3SK131(V12) | FET | | |
| Q3 | | | DTC114EK | DIGITAL TRANSISTOR | KP | |
| Q4 | | | DTC114EK | DIGITAL TRANSISTOR | | |
| Q5 | | | 3SK184(S) | FET | | |
| Q6 | | | 2SK582 | FET | | |
| Q7 | | | 3SK184(S) | FET | | |
| Q8 | | | DTC114EK | DIGITAL TRANSISTOR | | |
| Q12 | | | 2SC2714(Y) | TRANSISTOR | KP | |
| Q14 | | | 2SC2712(Y) | TRANSISTOR | | |
| Q15 | | | DTC114EK | DIGITAL TRANSISTOR | KP | |
| Q16 | | | 2SK208(Y) | FET | KP | |
| Q17 | | | 2SC2712(Y) | TRANSISTOR | | |
| Q18 | | | 2SB1302S | TRANSISTOR | | |
| Q19 | | | 2SC2712(Y) | TRANSISTOR | | |
| Q20 ,21 | | | 2SC2714(Y) | TRANSISTOR | | |
| Q22 | | | DTC114EK | DIGITAL TRANSISTOR | | |
| Q23 | | | 2SK208(Y) | FET | | |
| Q24 | | | 2SC2714(Y) | TRANSISTOR | | |
| Q25 | | | DTC114EK | DIGITAL TRANSISTOR | | |
| Q26 | | | 2SC2712(Y) | TRANSISTOR | | |
| Q27 | | | DTC114EK | DIGITAL TRANSISTOR | | |
| Q28 | | | 2SB1119S | TRANSISTOR | | |
| Q29 | | | 2SC2712(Y) | TRANSISTOR | | |
| Q30 | | | DTC114EK | DIGITAL TRANSISTOR | | |
| Q31 | | | 2SB1119S | TRANSISTOR | | |
| Q32 | | | DTC114EK | DIGITAL TRANSISTOR | | |
| Q33 | | | DTC114EK | DIGITAL TRANSISTOR | | |
| Q34 | | | 2SA1162(Y) | TRANSISTOR | | |
| Q35 | | | 2SC2712(Y) | TRANSISTOR | | |
| Q36 | | | 2SA1307(Y) | TRANSISTOR | | |
| Q37 | | | 2SD1757K | TRANSISTOR | | |
| Q38 | | | 2SC2714(Y) | TRANSISTOR | | |
| Q39 ,40 | | | 2SJ144(GR) | FET | | |
| Q201-204 | | | 2SA1519 | TRANSISTOR | | |
| Q205 | | | 2SD1682(R,S) | TRANSISTOR | | |
| Q206-208 | | | 2SC2712(Y) | TRANSISTOR | | |
| Q209,210 | | | DTC114EK | DIGITAL TRANSISTOR | | |
| Q211 | | | DTD143EK | DIGITAL TRANSISTOR | | |
| Q212 | | | DTC114EK | DIGITAL TRANSISTOR | | |
| Q401 | | | FMW1 | TRANSISTOR | | |
| TH2 | | | 112-202-2 | DIGITAL THERMISTOR(2K) | | |
| S212 | | | W02-0388-05 | ENCODER | | |
| | | X58-3480-01 | SUB UNIT (430 PLL) | | | |
| | | X58-3500-00 | SUB UNIT (144 PLL) | | | |
| | | X58-3500-00 | SUB UNIT (144 PLL) | | | |
| | | X58-3670-11 | SUB UNIT (144 PLL) | | | |
| | | X59-3610-00 | MODULE UNIT (MIC AMP) | | | |
| | | | | | M1M2E1 | |
| | | | | | E2 | |
| | | | | | KP | |

E: Scandinavia & Europe K: USA P: Canada W: Europe

TM-702A: K,P,M,M2

U: PX(Far East, Hawaii) T: England M: Other Areas

TM-702E: E,E2

UE: AAFES(Europe) X: Australia

▲ indicates safety critical components.

PARTS LIST

* New Parts

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TX-RX UNIT (X57-3680-XX),(X57-3682-XX)

430 PLL UNIT (X58-3480-01)

| Ref. No. | Address | New Parts | Parts No. | Description | | | Desti- nation | Re- marks |
|----------------------------|---------|-----------|---------------|------------------------------|---------|------|------------------|--------------|
| 参照番号 | 位 置 | 新 | 部品番号 | 部品名／規格 | | | 仕 向 | 備考 |
| | | | X59-3800-00 | MODULE UNIT (ELE VOL) | | | | |
| 430 PLL UNIT (X58-3480-01) | | | | | | | | |
| C1 | | | CC73FCH1H120J | CHIP C | 12PF | J | | |
| C2 | | | CK73FB1H223K | CHIP C | 0.022UF | K | | |
| C3 | | | CC73FUJ1H220J | CHIP C | 22PF | J | | |
| C4 | | | CC73FCH1H150J | CHIP C | 15PF | J | | |
| | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C5 | | | CK73EB1H683K | CHIP C | 0.068UF | K | | |
| C6 ,7 | | | CK73FB1H223K | CHIP C | 0.022UF | K | | |
| C8 ,9 | | | C92-0007-05 | CHIP TAN | 2.2UF | 20WV | | |
| C10 | | | C92-0002-05 | CHIP TAN | 0.22UF | 35WV | | |
| C11 | | | CK73FB1H223K | CHIP C | 0.022UF | K | | |
| C12 | | | CC73FCH1H100D | CHIP C | 10PF | D | | |
| C13 | | | CK73FB1H223K | CHIP C | 0.022UF | K | | |
| C14 | | | CC73FCH1H040C | CHIP C | 4PF | C | | |
| C15 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C16 ,17 | | | CC73FSL1H101J | CHIP C | 100PF | J | | |
| C101 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| C102 | | | CK73FB1H471K | CHIP C | 470PF | K | | |
| C103 | | | CC73FCH1H470J | CHIP C | 47PF | J | | |
| C104 | | | CC73FCH1H120J | CHIP C | 12PF | J | | |
| C105 | | | CC73FCH1H080D | CHIP C | 8PF | D | | |
| C106,107 | | | CC73FCH1HR75C | CHIP C | 0.75PF | C | | |
| C108 | | | CC73FCH1H0R5C | CHIP C | 0.5PF | C | | |
| C109 | | | CC73FCH1H090D | CHIP C | 9PF | D | | |
| C110 | | | CC73FCH1H080D | CHIP C | 8PF | D | | |
| C111 | | | CC73FCH1H0R5C | CHIP C | 0.5PF | C | | |
| C112 | | | CC73FCH1H040C | CHIP C | 4PF | C | | |
| C113-115 | | | CK73FB1H102K | CHIP C | 1000PF | K | | |
| CN1 | | | E40-5201-05 | PIN CONNECTOR | | | | |
| CN101 | | | E40-0411-05 | PIN CONNECTOR | | | | |
| CN102 | | | E40-0311-05 | PIN CONNECTOR | | | | |
| | | | F11-1122-14 | SHIELDING COVER | | | | |
| L1 | | | L40-3972-80 | SMALL FIXED INDUCTOR(39NH) | | | | |
| L101,102 | | | L40-8282-19 | SMALL FIXED INDUCTOR(0.82UH) | | | | |
| L103 | | | L34-2333-05 | COIL | | | | |
| L104 | | | L40-5682-19 | SMALL FIXED INDUCTOR(0.56UH) | | | | |
| L105 | | | L40-3382-19 | SMALL FIXED INDUCTOR(0.33UH) | | | | |
| L106 | | | L40-3972-80 | SMALL FIXED INDUCTOR(39NH) | | | | |
| R1 ,2 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | |
| R3 | | | RK73FB2A392J | CHIP R | 3.9K | J | 1/10W | |
| R4 | | | RK73FB2A332J | CHIP R | 3.3K | J | 1/10W | |
| R5 | | | RK73FB2A221J | CHIP R | 220 | J | 1/10W | |
| R6 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | |
| R7 | | | RK73FB2A474J | CHIP R | 470K | J | 1/10W | |
| R8 | | | RK73FB2A682J | CHIP R | 6.8K | J | 1/10W | |
| R9 | | | RK73FB2A822J | CHIP R | 8.2K | J | 1/10W | |
| R10 -13 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | |
| R14 | | | RK73FB2A331J | CHIP R | 330 | J | 1/10W | |
| R15 | | | RK73FB2A472J | CHIP R | 4.7K | J | 1/10W | |
| R16 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | |
| R18 ,19 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | |

E: Scandinavia & Europe K: USA P: Canada W:Europe

TM-702A:K,P,M,M2

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PARTS LIST

* New Parts

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430 PLL UNIT (X58-3480-01)

144 PLL UNIT (X58-3500-00)

| Ref. No. 参照番号 | Address 位 置 | New Parts 新 | Parts No. 部品番号 | Description 部品名 / 規格 | | | | Desti- nation 仕向 | Re- marks 備考 |
|------------------|----------------|-------------------|-------------------|--------------------------|-------|---|-------|------------------------|--------------------|
| R101 | | | R92-0670-05 | CHIP R | 0 OHM | | | | |
| R102 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R103 | | | RK73FB2A683J | CHIP R | 68K | J | 1/10W | | |
| R104 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | | |
| R105 | | | RK73FB2A560J | CHIP R | 56 | J | 1/10W | | |
| R107 | | | RK73FB2A470J | CHIP R | 47 | J | 1/10W | | |
| R108 | | | RK73FB2A392J | CHIP R | 3.9K | J | 1/10W | | |
| R109 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R110 | | | RK73FB2A101J | CHIP R | 100 | J | 1/10W | | |
| R111 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| D1 | | | ISS184 | DIODE | | | | | |
| D101,102 | | | 1T33C | DIODE | | | | | |
| D103 | | | 1SV164 | IC(FREQ SYNTHESIZER PLL) | | | | | |
| IC1 | | | M54959FP | TRANSISTOR | | | | | |
| Q1 -3 | | | 2SC3324(B) | | | | | | |
| Q4 | | | DTC144EK | DIGITAL TRANSISTOR | | | | | |
| Q5 | | | 2SC2714(Y) | TRANSISTOR | | | | | |
| Q101 | | | 2SK582 | FET | | | | | |
| Q102 | | | 2SC3120 | TRANSISTOR | | | | | |
| Q103 | | | 2SC3324(G) | TRANSISTOR | | | | | |

144 PLL UNIT (X58-3500-00) M, M2, E, E2

| | | | | | | | | | |
|----------|--|--|---------------|-----------------------------|---------|-------|-------|--|--|
| C1 | | | CK73FB1E223K | CHIP C | 0.022UF | K | | | |
| C2 ,3 | | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C4 | | | CK73FB1E223K | CHIP C | 0.022UF | K | | | |
| C5 | | | CK73FB1H471K | CHIP C | 470PF | K | | | |
| C6 ,7 | | | C92-0507-05 | CHIP TAN | 4.7UF | 6.3WV | | | |
| C8 | | | C92-0003-05 | CHIP TAN | 0.47UF | 25WV | | | |
| C9 | | | CK73EB1E473K | CHIP C | 0.047UF | K | | | |
| C10 | | | CC73FCH1H050C | CHIP C | 5PF | C | | | |
| C11 ,12 | | | CK73FB1H102K | CHIP C | 1000PF | K | | | |
| C13 ,14 | | | CK73FB1E223K | CHIP C | 0.022UF | K | | | |
| CN1 | | | E40-5201-05 | PIN CONNECTOR(7P) | | | | | |
| CN101 | | | E40-0411-05 | PIN CONNECTOR(4P) | | | | | |
| CN102 | | | E40-0311-05 | PIN CONNECTOR(3P) | | | | | |
| | | | F11-1122-14 | SHIELDING COVER | | | | | |
| L1 | | | L40-3391-19 | SMALL FIXED INDUCTOR(3.3UH) | | | | | |
| L101,102 | | | L40-4791-19 | SMALL FIXED INDUCTOR(4.7UH) | | | | | |
| L103 | | | L34-2331-05 | COIL | (RX) | | | | |
| L104-106 | | | L40-4791-19 | SMALL FIXED INDUCTOR(4.7UH) | | | | | |
| L107 | | | L34-2332-05 | COIL | (TX) | | | | |
| L108 | | | L40-4791-19 | SMALL FIXED INDUCTOR(4.7UH) | | | | | |
| R1 -5 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | | |
| R6 | | | RK73GB1J152J | CHIP R | 1.5K | J | 1/16W | | |
| R7 | | | RK73GB1J222J | CHIP R | 2.2K | J | 1/16W | | |
| R8 | | | RK73GB1J392J | CHIP R | 3.9K | J | 1/16W | | |
| R9 | | | RK73GB1J222J | CHIP R | 2.2K | J | 1/16W | | |
| R10 ,11 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | | |
| R13 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | | |
| R14 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | | |
| R15 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | | |
| R16 | | | RK73GB1J103J | CHIP R | 10K | J | 1/16W | | |
| R17 | | | RK73GB1J221J | CHIP R | 220 | J | 1/16W | | |
| R101 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | | |

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TM-702E: E, E2

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PARTS LIST

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144 PLL UNIT (X58-3500-00)

144 PLL UNIT (X58-3670-11)

| Ref. No. | Address | New Parts 新 | Parts No. | Description | | | | Desti- nation 仕向 | Re- marks 備考 |
|--------------------------------|---------|----------------|--------------------------|-------------|-------|--|--|------------------------|--------------------|
| 参照番号 | 位 置 | 部品番号 | 部品名 / 規格 | | | | | | |
| R102 | | RK73GB1J470J | CHIP R 47 | J | 1/16W | | | | |
| R103 | | RK73GB1J101J | CHIP R 100 | J | 1/16W | | | | |
| R104 | | RK73GB1J222J | CHIP R 2.2K | J | 1/16W | | | | |
| R105 | | RK73GB1J472J | CHIP R 4.7K | J | 1/16W | | | | |
| R106 | | RK73GB1J471J | CHIP R 470 | J | 1/16W | | | | |
| R107 | | RK73GB1J101J | CHIP R 100 | J | 1/16W | | | | |
| R108 | | RK73GB1J470J | CHIP R 47 | J | 1/16W | | | | |
| R109 | | RK73GB1J682J | CHIP R 6.8K | J | 1/16W | | | | |
| R110 | | RK73GB1J470J | CHIP R 47 | J | 1/16W | | | | |
| R111 | | RK73GB1J101J | CHIP R 100 | J | 1/16W | | | | |
| R112 | | RK73GB1J222J | CHIP R 2.2K | J | 1/16W | | | | |
| R113 | | RK73GB1J472J | CHIP R 4.7K | J | 1/16W | | | | |
| R114 | | RK73GB1J471J | CHIP R 470 | J | 1/16W | | | | |
| C101 | | CK73GB1E103K | CHIP C | | | | | | |
| C102 | | CC73GCH1H010C | CHIP C | | | | | | |
| C103, 104 | | CK73GB1E103K | CHIP C | | | | | | |
| C105 | | CC73GCH1H010C | CHIP C | | | | | | |
| C106 | | CC73GCH1H220J | CHIP C | | | | | | |
| C107, 108 | | CK73GB1H102K | CHIP C | | | | | | |
| C109, 110 | | CK73GB1E103K | CHIP C | | | | | | |
| C111 | | CC73GCH1H020C | CHIP C | | | | | | |
| C112, 113 | | CK73GB1E103K | CHIP C | | | | | | |
| C114 | | CC73GCH1H010C | CHIP C | | | | | | |
| C115 | | CC73GCH1H220J | CHIP C | | | | | | |
| C116 | | CK73GB1H102K | CHIP C | | | | | | |
| D101-104 | | 1SV166 | DIODE | | | | | | |
| IC1 | | M54959FP | IC(FREQ SYNTHESIZER PLL) | | | | | | |
| Q1 , 2 | | 2SC3324(B) | TRANSISTOR | | | | | | |
| Q3 | | 2SC2712(Y) | TRANSISTOR | | | | | | |
| Q4 | | 2SC2714(Y) | TRANSISTOR | | | | | | |
| Q101 | | 2SK508NV(K52) | FET | | | | | | |
| Q102 | | DTC114EK | DIGITAL TRANSISTOR | | | | | | |
| Q103 | | 2SC3120 | TRANSISTOR | | | | | | |
| Q104 | | 2SK508NV(K52) | FET | | | | | | |
| Q105 | | DTC114EK | DIGITAL TRANSISTOR | | | | | | |
| Q106 | | 2SC3120 | TRANSISTOR | | | | | | |
| 144 PLL UNIT (X58-3670-11) K,P | | | | | | | | | |
| C1 | | CK73FB1E223K | CHIP C 0.022UF | K | | | | | |
| C2 , 3 | | CK73FB1H102K | CHIP C 1000PF | K | | | | | |
| C4 | | CK73FB1E223K | CHIP C 0.022UF | K | | | | | |
| C5 | | CK73FB1H471K | CHIP C 470PF | K | | | | | |
| C6 , 7 | | C92-0507-05 | CHIP TAN 4.7UF | 6.3WV | | | | | |
| C8 | | C92-0003-05 | CHIP TAN 0.47UF | 25WV | | | | | |
| C9 | | CC73FB1E223K | CHIP C 0.022UF | K | | | | | |
| C10 | | CK73FCH1H050C | CHIP C 5.0PF | C | | | | | |
| C11 , 12 | | CK73FB1H102K | CHIP C 1000PF | K | | | | | |
| C13 , 14 | | CK73FB1E223K | CHIP C 0.022UF | K | | | | | |
| C101 | | CK73GB1E103K | CHIP C 0.010UF | K | | | | | |
| C102 | | CC73GCH1H010C | CHIP C 1PF | C | | | | | |
| C103, 104 | | CK73GB1E103K | CHIP C 0.010UF | K | | | | | |
| C105 | | CC73GCH1H010C | CHIP C 1PF | C | | | | | |
| C106 | | CC73GCH1H220J | CHIP C 22PF | J | | | | | |
| C107, 108 | | CK73GB1H102K | CHIP C 1000PF | K | | | | | |
| C109, 110 | | CK73GB1E103K | CHIP C 0.010UF | K | | | | | |

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PARTS LIST

* New Parts

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144 PLL UNIT (X58-3670-11)
MIC AMP UNIT (X59-3610-00)

| Ref. No. 参照番号 | Address 位 置 | New Parts 新 | Parts No. 部品番号 | Description 部品名／規格 | | | Desti- nation 仕向 | Re- marks 備考 |
|----------------------------|----------------|-------------------|-------------------|-----------------------------|---------|---|------------------------|--------------------|
| C111 | | | CC73GCH1H020C | CHIP C | 2.0PF | C | | |
| C112, 113 | | | CK73GB1E103K | CHIP C | 0.010UF | K | | |
| C114 | | | CC73GCH1H010C | CHIP C | 1PF | C | | |
| C115 | | | CC73GCH1H220J | CHIP C | 22PF | J | | |
| C116 | | | CK73GB1H102K | CHIP C | 1000PF | K | | |
| CN1 | | | E40-5201-05 | PIN CONNECTOR(7P) | | | | |
| CN101 | | | E40-0411-05 | PIN CONNECTOR(4P) | | | | |
| CN102 | | | E40-0311-05 | PIN CONNECTOR(3P) | | | | |
| | | | F11-1122-14 | SHIELDING COVER | | | KP | |
| L1 | | | L40-3391-19 | SMALL FIXED INDUCTOR(3.3UH) | | | | |
| L101, 102 | | | L40-3391-19 | SMALL FIXED INDUCTOR(3.3UH) | | | | |
| L103 | | | L34-2331-05 | COIL | | | | |
| L104-106 | | | L40-4791-19 | SMALL FIXED INDUCTOR(4.7UH) | | | | |
| L107 | | | L34-2332-05 | COIL | | | | |
| L108 | | | L40-4791-19 | SMALL FIXED INDUCTOR(4.7UH) | | | | |
| R1 -5 | | | RK73FB2A473J | CHIP R | 47K | J | 1/10W | |
| R6 | | | RK73FB2A152J | CHIP R | 1.5K | J | 1/10W | |
| R7 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | |
| R8 | | | RK73FB2A392J | CHIP R | 3.9K | J | 1/10W | |
| R9 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | |
| R10 -12 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | |
| R13 | | | RK73FB2A221J | CHIP R | 220 | J | 1/10W | |
| R14 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | |
| R15 | | | R92-0670-05 | CHIP R | 0 OHM | | | |
| R101 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R102 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R103 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R104 | | | RK73GB1J222J | CHIP R | 2.2K | J | 1/16W | |
| R105 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R106 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | |
| R107 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R108 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R109 | | | RK73GB1J682J | CHIP R | 6.8K | J | 1/16W | |
| R110 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | |
| R111 | | | RK73GB1J101J | CHIP R | 100 | J | 1/16W | |
| R112 | | | RK73GB1J222J | CHIP R | 2.2K | J | 1/16W | |
| R113 | | | RK73GB1J472J | CHIP R | 4.7K | J | 1/16W | |
| R114 | | | RK73GB1J471J | CHIP R | 470 | J | 1/16W | |
| D101, 102 | | | 1T33C | DIODE | | | | |
| D103, 104 | | | 1SV166 | DIODE | | | | |
| IC1 | | | M54959FP | IC(FREQ SYNTHESIZER PLL) | | | | |
| Q1 , 2 | | | 2SC3324(B) | TRANSISTOR | | | | |
| Q3 | | | DTC144EK | DIGITAL TRANSISTOR | | | | |
| Q4 | | | 2SC2714(Y) | TRANSISTOR | | | | |
| Q101 | | | 2SK508NV(K52) | FET | | | | |
| Q102 | | | DTC114EK | DIGITAL TRANSISTOR | | | | |
| Q103 | | | 2SC3120 | TRANSISTOR | | | | |
| Q104 | | | 2SK508NV(K52) | FET | | | | |
| Q105 | | | DTC114EK | DIGITAL TRANSISTOR | | | | |
| Q106 | | | 2SC3120 | TRANSISTOR | | | | |
| MIC AMP UNIT (X59-3610-00) | | | | | | | | |
| C1 | | | CK73FF1E104Z | CHIP C | 0.1UF | Z | | |

E: Scandinavia & Europe K: USA P: Canada W: Europe

TM-702A: K, P, M, M2

U: PX(Far East, Hawaii) T: England M: Other Areas

TM-702E: E, E2

UE : AAFES(Europe)

X: Australia

△ indicates safety critical components

PARTS LIST

* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnés dans le Parts No. ne sont pas fournis.

Telle ohne Parts No. werden nicht geliefert.

MIC AMP UNIT (X59-3610-00)
ELE VOL UNIT (X59-3800-00)

| Ref. No. 参照番号 | Address 位 置 | New Parts 新 | Parts No. 部品番号 | Description 部品名 / 規格 | | | | Desti- nation 仕 向 | Re- marks 備考 |
|----------------------------|----------------|-------------------|-------------------|-------------------------|---------|-------|-------|-------------------------|--------------------|
| C2 | | | CK73GB1H102K | CHIP C | 1000PF | K | | | |
| C3 | | | CK73FB1E333K | CHIP C | 0.033UF | K | | | |
| C4 | | | CC73GCH1H270J | CHIP C | 27PF | J | | | |
| C5 | | | C92-0004-05 | CHIP TAN | 1.0UF | 16WV | | | |
| C6 | | | CK73FB1E333K | CHIP C | 0.033UF | K | | | |
| C7 | | | CK73GB1H681K | CHIP C | 680PF | K | | | |
| C8 | | | CK73GB1H332K | CHIP C | 3300PF | K | | | |
| C9 | | | CC73GCH1H820J | CHIP C | 82PF | J | | | |
| C10 | | | CC73GCH1H101J | CHIP C | 100PF | J | | | |
| C11 | | | CK73GB1H102K | CHIP C | 1000PF | K | | | |
| | | | E23-0471-05 | TERMINAL | | | | | |
| R1 | | | RK73GB1J223J | CHIP R | 22K | J | 1/16W | | |
| R2 | | | RK73GB1J104J | CHIP R | 100K | J | 1/16W | | |
| R3 | | | RK73GB1J561J | CHIP R | 560 | J | 1/16W | | |
| R4 | | | RK73GB1J470J | CHIP R | 47 | J | 1/16W | | |
| R5 | | | RK73GB1J561J | CHIP R | 560 | J | 1/16W | | |
| R6 | | | R92-1252-05 | CHIP R | 0 ΩHM | | | | |
| R7 | | | RK73GB1J394J | CHIP R | 390K | J | 1/16W | | |
| R8 | | | RK73GB1J224J | CHIP R | 220K | J | 1/16W | | |
| R9 | | | RK73GB1J184J | CHIP R | 180K | J | 1/16W | | |
| R10 | | | RK73GB1J333J | CHIP R | 33K | J | 1/16W | | |
| R11 | | | RK73GB1J473J | CHIP R | 47K | J | 1/16W | | |
| R12 | | | RK73GB1J224J | CHIP R | 220K | J | 1/16W | | |
| R13 | -15 | | RK73GB1J823J | CHIP R | 82K | J | 1/16W | | |
| R16 | | | R92-1252-05 | CHIP R | 0 ΩHM | | | | |
| IC1 | | | NJM4558M | IC(OP AMP X2) | | | | | |
| Q1 | | | 2SC4116(GR) | TRANSISTOR | | | | | |
| ELE VOL UNIT (X59-3800-00) | | | | | | | | | |
| C1 | | | CK73FB1E104K | CHIP C | 0.10UF | K | | | |
| C2 | | | C92-0004-05 | CHIP TAN | 1.0UF | 16WV | | | |
| C3 | | | CK73FB1H103K | CHIP C | 0.010UF | K | | | |
| C4 | | | C92-0005-05 | CHIP TAN | 2.2UF | 6.3WV | | | |
| C5 | , 6 | | CK73FB1E104K | CHIP C | 0.10UF | K | | | |
| C7 | , 8 | | C92-0507-05 | CHIP TAN | 4.7UF | 6.3WV | | | |
| C9 | , 10 | | CC73FSL1H101J | CHIP C | 100PF | J | | | |
| C11 | | | CK73EF1C105Z | CHIP C | 1.0UF | Z | | | |
| C12 | | | C92-0005-05 | CHIP TAN | 2.2UF | 6.3WV | | | |
| | | | E23-0471-05 | TERMINAL | | | | | |
| R1 | , 2 | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R3 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |
| R4 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R5 | | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |
| R6 | | | RK73FB2A103J | CHIP R | 10K | J | 1/10W | | |
| R7 | -10 | | RK73FB2A474J | CHIP R | 470K | J | 1/10W | | |
| R11 | , 12 | | RK73FB2A104J | CHIP R | 100K | J | 1/10W | | |
| R13 | | | RK73FB2A822J | CHIP R | 8.2K | J | 1/10W | | |
| R14 | | | RK73FB2A392J | CHIP R | 3.9K | J | 1/10W | | |
| R15 | | | RK73FB2A222J | CHIP R | 2.2K | J | 1/10W | | |
| R16 | | | RK73FB2A102J | CHIP R | 1.0K | J | 1/10W | | |
| R17 | , 18 | | RK73FB2A223J | CHIP R | 22K | J | 1/10W | | |
| R19 | , 20 | | RK73FB2A472J | CHIP R | 4.7K | J | 1/10W | | |
| IC1 | | | NJM4558M | IC(OP AMP X2) | | | | | |

E: Scandinavia & Europe K: USA P: Canada W: Europe

TM-702A:K,P,M,M2

U: PX(Far East, Hawaii) T: England M: Other Areas

TM-702E:E,E2

UE : AAFES(Europe) X: Australia

▲ indicates safety critical components.

PARTS LIST

* New Parts

Parts without Parts No. are not supplied.

Les articles non mentionnes dans le Parts No. ne sont pas fournis.

Teile ohne Parts No. werden nicht geliefert.

ELE VOL UNIT (X59-3800-00)

| Ref. No. 参照番号 | Address 位 置 | New Parts 新 | Parts No. 部品番号 | Description 部品名／規格 | Desti- nation 仕向 | Re- marks 備考 |
|------------------|----------------|-------------------|-------------------|-----------------------|------------------------|--------------------|
| IC2 | | | BU4053BF | IC | | |
| IC3 | | | LC7532M | IC(BILATERAL SWITCH) | | |
| IC4 , 5 | | | BU4094BF | IC | | |
| IC6 | | | BU4053BF | IC | | |
| Q1 - 4 | | | DTC143EK | DIGITAL TRANSISTOR | | |
| Q5 , 6 | | | 2SD1757K | TRANSISTOR | | |

E: Scandinavia & Europe K: USA P: Canada W: Europe

TM-702A: K, P, M, N, Z

U: PX(Far East, Hawaii) T: England M: Other Areas

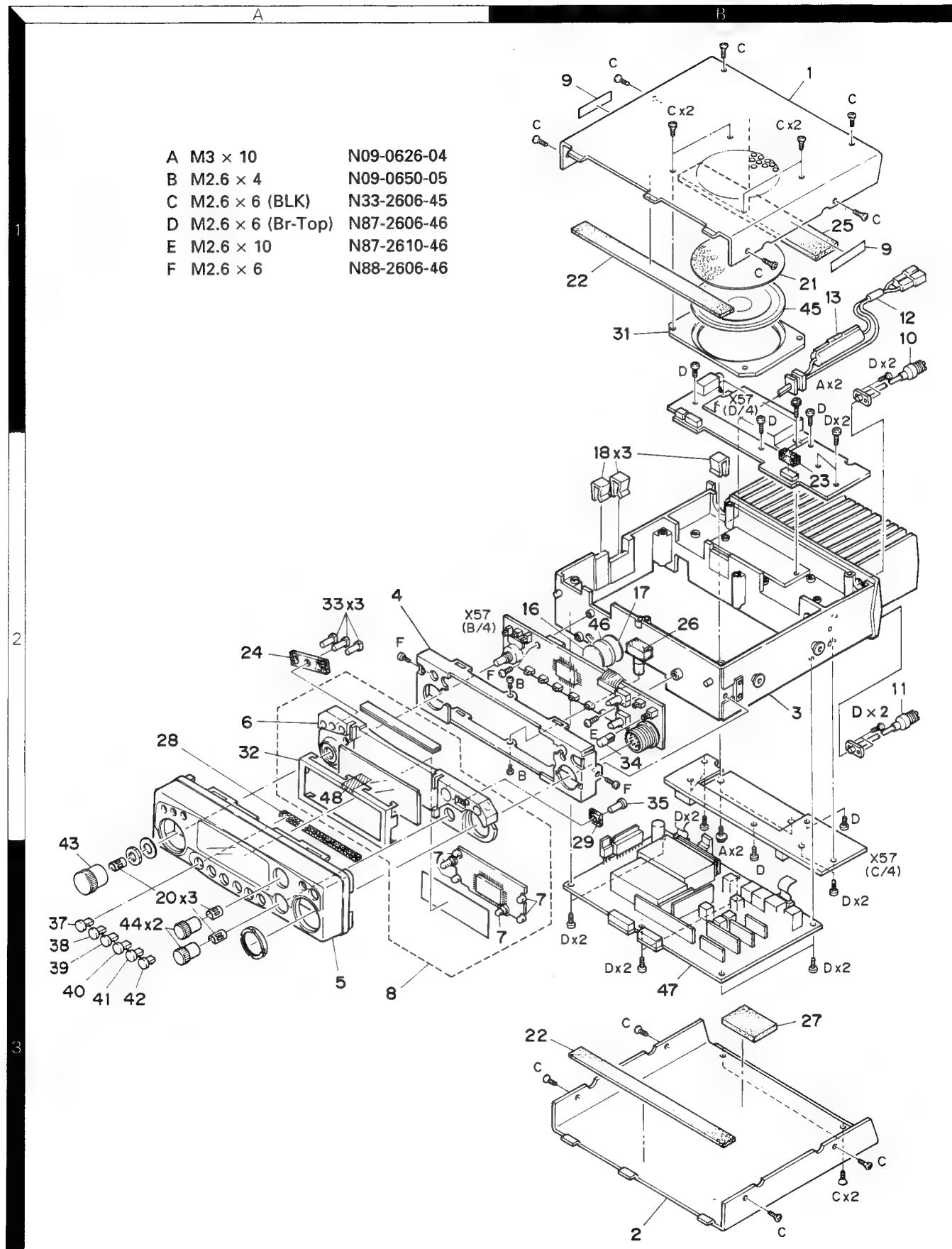
TM-702A: E, E2

UE: AAFES(Europe) X: Australia

⚠ indicates safety critical components

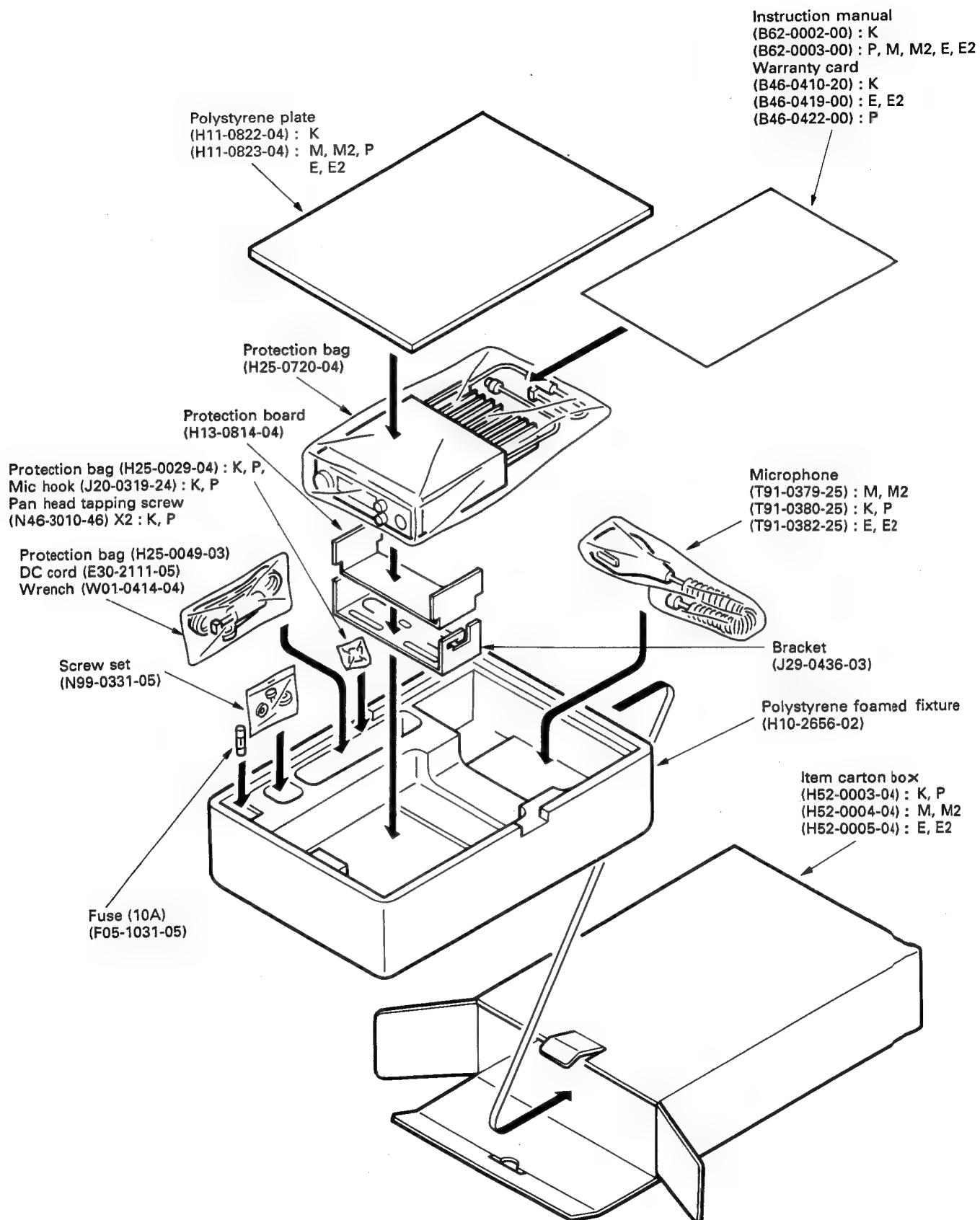
TM-702A/E

EXPLODED VIEW



Parts with the explode numbers larger than 700 are not supplied.

PACKING



TM-702A/E

ADJUSTMENT

REQUIRED TEST EQUIPMENT

1. **DC V.M and Tester**
 - 1) High input impedance
2. **RF VTVM (RF V.M)**
 - 1) Input impedance : 1MΩ min., 2pF max.
 - 2) Voltage range : F.S = 10mV to 300V
 - 3) Frequency range : Up to 450MHz
3. **Frequency Counter (f. counter)**
 - 1) Input sensitivity : Approx, 50mV
 - 2) Frequency range : Up to 450MHz
4. **DC Power Supply**
 - 1) Voltage : 10V to 17V, variable
 - 2) Current : 8A min.
5. **Power Meter**
 - 1) Measurement range : Approx, 30W, 3W, 1W
 - 2) Input impedance : 50Ω
 - 3) Frequency range : 450MHz
6. **AF VTVM (AF V.M)**
 - 1) Input impedance : 1MΩ min.
 - 2) Voltage range : F.S = 1mV to 30V
 - 3) Frequency range : 50Hz to 10kHz
7. **AF Generator (AG)**
 - 1) Output frequency : 100Hz to 10kHz
 - 2) Output voltage : 0.5mV to 1V
8. **Linear Detector**
 - 1) Frequency range : 450MHz
9. **Spectrum Analyzer**
 - 1) Frequency range : 450MHz
10. **Directional Coupler**
11. **Oscilloscope**
 - 1) High sensitivity oscilloscope with horizontal input terminal
12. **SSG**
 - 1) Frequency range : 144MHz band
 - 2) Modulation: AM and FM MOD.
 - 3) Output level : -20dB μ ~ 100dB μ
13. **Dummy Load**
 - 1) 8Ω, 5W (approx.)
14. **Noise Generator**
 - 1) Must generate ignition-like noise containing harmonics beyond 450MHz.

15. Sweep Generator

1) Sweep range : 144MHz bands

16. Tracking Generator

PREPARATION

1) Unless otherwise specified, knobs and switches should be set as follows **Table 7**.

| POWER SW | ON | CALL SW | OFF |
|------------|-----|------------|-----|
| AF VOL VR | MIN | SHIFT/DTSS | OFF |
| SQL VOL VR | MIN | ONE/T,ALT | OFF |
| LOW SW | OFF | REV/STEP | OFF |
| VFO, MR/M | VFO | BAND/DUP | OFF |

Table 7

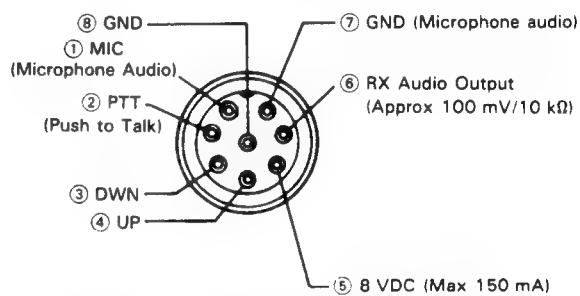


Fig. 17 MIC terminals (view from front panel side)

- 2) Use an insulated adjusting rod to adjust trimmer and coils.
- 3) To prevent damaging SSG, never set the stand by switch to SEND while adjusting the receiver section.
- 4) Be sure to turn the power switch OFF, before connecting the power cable to a power source.
- 5) Meter and display section should be set as follows **Fig. 18**.

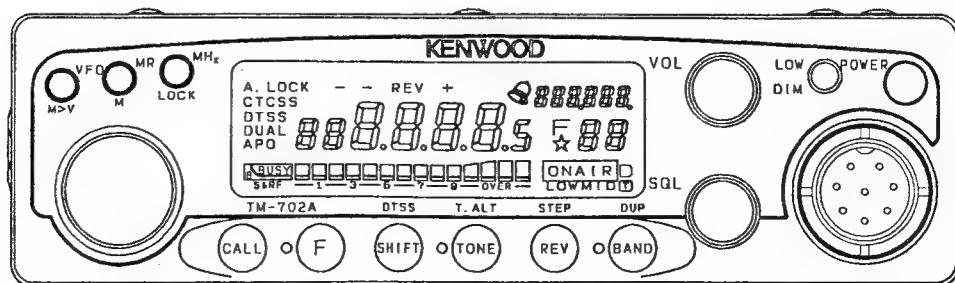


Fig. 18

ADJUSTMENT

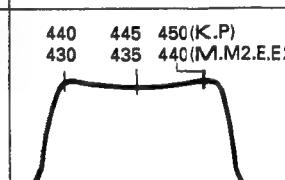
COMMON SECTION ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|------------|--|----------------|------|----------|------------|-------|--------|---|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Setting | 1) Source voltage: DC 13.8V POWER SW: OFF VOL SW: OFF SQL VR: MAX | | | | | | | |
| 2. Reset | 1) Turn POWER SW ON while holding down MR/M. | | | | | | | Display 144.000 Display 430.000 M. M2. E. E2 440.000 K. P |

PLL SECTION ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|---------------|--|----------------|------------|-------------|------------|-------|--------|-------------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1.VCO voltage | 1) FREQ. : 144.975 E. E2 FREQ. : 146.000 K. M. M2. P Receive | DC V.M | TX-RX | TP5 | | Check | | 2.5V or more. |
| | 2) Transmit | | Rear panel | ANT1 (144M) | | | | 4.5 ~ 6.5V "ON AIR" light on. |
| | 3) FREQ. : 435.000 M. M2. E. E2 FREQ. : 445.000 K. P Receive | Power meter | TX-RX | TP4 | | | | 2.5V or more. |
| | 4) Transmit | | Rear panel | ANT2 (430M) | | | | 6.0V "ON AIR" light on. |

RECEIVER SECTION ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|----------------------------|---|---|---------------------|-----------------------|-------------|-----------------|--|---|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Helical (430 MHz) | 1) FREQ. : 435.050 M. M2. E. E2 FREQ. : 445.050 K. P Connect the tracking generator to ANT2. Connect the spectrum analyzer to TP1. | Tracking generator Spectrum analyzer | Rear panel TX-RX | ANT2 (430M) TP1 | TX-RX | TC1, 2 L8, 9 | Check whether required band obtained at max. gain. |  |
| 2-1. GAIN (144MHz) | 1) FREQ. : 145.050 E. E2 FREQ. : 146.050 K. P. M. M2 SSG output: 0.5μV (-113dBm) SSG MOD: 1kHz SSG DEV : 3kHz | SSG DC V.M | Rear panel TX-RX | ANT1 (144M) TP2 | TX-RX | L1-5 | MAX. | |
| 2-2. GAIN (430 MHz) | 1) FREQ. : 435.050 M. M2. E. E2 FREQ. : 445.050 K. P SSG output: 0.5μV (-113dBm) SSG MOD: 1kHz SSG DEV : 3kHz | SSG DC V.M | Rear panel TX-RX | ANT2 (430M) TP2 | | L12 | | 8:00 ~ 11:00 0.6A or less. |
| 3. Squelch | 1) SQL VR : Threshold point | AF V.M | Rear panel | SP | Front panel | SQL VR | Turn the SQL VR dockwise to the point at which squelch just close. | |
| | 2) Tight squelch FREQ. : 435.050 M. M2. E. E2 FREQ. : 445.050 K. P SSG output: 0.22μV (-120dBm) SSG MOD: 1kHz SSG DEV : 3kHz SQL VR : MAX | SSG AF V.M SP | Rear panel Front | ANT2 (430M) EXT.SP | TX-RX | VR1 (CCW) | Set to the point at which squelch just open. | |
| 4. SUB BAND squelch [DUAL] | 1) FREQ. : 145.050 E. E2 FREQ. : 146.050 M. M2. K. P SQL VR : MAX SSG output: 0.1μV (-127dBm) SSG MOD: 1kHz SSG DEV : 3kHz | SSG AF V.M SP | Rear panel | SP | TX-RX | VR8 | Set to the point at which SUB squelch just open. | |
| | 2) SSG output: 0.08μV (-129dBm) | | | | | | | SUB squelch close |

TM-702A/E

ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|---|---|---|---------------------------|----------------|------------|--------------|---------------------------|------------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 5-1 S-meter (144MHz) | 1) FREQ. : 146.050 M. M2. E. E2 FREQ. : 145.050 K. P SSG output: 4μV (-95dBm) SSG MOD: 1kHz SSG DEV : 3kHz | SSG S-meter | Rear panel Front panel | ANT1 (144M) | TX-RX | VR7 | Last S-meter segment off. | |
| | 2) SSG output: OFF | S-meter | Front panel | | | | Check | S-meter off. |
| 5-2 S-meter (430MHz) | 1) FREQ. : 435.050 M. M2. E. E2 FREQ. : 445.050 K. P SSG output: 4μV (-95dBm) SSG MOD: 1kHz SSG DEV : 3kHz | SSG S-meter | Rear panel Front panel | ANT2 (430M) | TX-RX | VR2 (CCW) | Last S-meter segment off. | |
| | 2) SSG output: OFF | S-meter | Front panel | | | | Check | S-meter off. |
| 6-1 Receiving sensitivity (144MHz) | 145.050 MHz E. E2 146.040 MHz K. M. M2. P SSG 0.18V (-122dBm) | SSG Oscilloscope Millivoltmeter Distortion meter | Rear panel | EXT-SP | | | Check | SNAD 12dB or more |
| | Adjust the band edge in the same way. FREQ. 144.050 MHz]— (W) E.E2 FREQ. 145.950 MHz]— M. W FREQ. 144.040 MHz]— K. M. P. FREQ. 147.950 MHz]— M2 | | | | | | | |
| 6-2 Sensitivity (430MHz) | FREQ. 435.050 MHz M. M2. E. E2 FREQ. 445.050 MHz K. P SSG 0.18μV (-122dBm) | | | | | | | |
| | Set the band edge in the same way. FREQ. 430.050 MHz]— M. W 439.950 MHz]— M. W 438.050 MHz]— K. P 449.950 MHz]— K. P | | | | | | | |
| 7-1 Signal-to-noise (S/N) ratio with high-level signal | 145.050 MHz E. E2 146.040 MHz K. M. P. M2 SSG 501μV (-53dBm) AF 0.63 V/8W | SSG Oscilloscope Millivoltmeter Distortion meter | Rear panel | EXT. SP | | | Check | S/N ratio of 46 dB or better |
| 7-2 Signal-to-noise (S/N) ratio with high-level signal | FREQ. 435.050 MHz E. E2 445.050 MHz K. M. P. M2 SSG 501μV (-53dBm) AF 0.63 V/8W | | | | | | | |

COMMON TRANSMITTER SECTION ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|-----------------------|---|--------------------------|------------|----------------|------------|-------|--|------------------------|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Transmit frequency | 1) FREQ. 435.000 M. M2. E. E2 FREQ. 445.000 K. P Transmit | f.counter Power meter | Rear panel | ANT2 (430M) | TX-RX | TC3 | 435.000.0 MHz M.M2,E,E2 445.000.0MHz K,P | ±100Hz |

144MHz TRANSMITTER SECTION ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|-------------------------|--|---|------------|----------------|--------------|-----------------------|-----------------------------|--|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Power | 1) HI POWER FREQ. : 144.975 E. E2 FREQ. : 146.000 K. M. M2. P HI/LOW SW : HI Transmit | Power meter Ammeter | Rear panel | ANT1 (144M) | 430 FINAL | VR402 (CCW) | MAX Read RFmeter | 30W or more. All RF meter on. "ON AIR" light on. |
| | 2) APC Transmit. | | | | | | VR402 28W | ±4W 8A or less. |
| | 3) MID POWER HI/LOW SW : MID Transmit | | | | | | VR5 10W Read RF meter | 8~12W 10RF meter on. |
| | 4) LOW POWER HI/LOW SW : LOW Transmit | | | | | | Check Read RF meter | 1.5~2.9W 6 RF meter on. |
| 2. Protection (Current) | 1) FREQ. : 144.975 E. E2 FREQ. : 146.000 K. M. M2. P ANT : Short 430 final unit VR404 : φ Transmit | Ammeter (REAR SIDE) VR404 (FRONT SIDE) | | | 430 FINAL | VR404 (CCW) VR4 | 4A | ±0.2A |

ADJUSTMENT

| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|-----------------------------|--|---|------------|----------------|------------|-------|--------------------|--|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 3. DEV | 1) FREQ. : 145.100 E. E2 FREQ. : 146.100 K. M. M2. P AG : 1kHz, 28mV E. E2 AG : 1kHz, 50mV K. M. M2. P HI/LOW SW : LOW Transmit | Linear detector Oscillo-scope Power meter | Rear panel | ANT1 (144M) | TX-RX | VR-4 | ±4.6kHz | ±200Hz Check for detected waveform. • Linear detector LPF: 20KHz HPF: 50Hz De-emphasis: OFF |
| | 2) MIC GAIN AG : 1kHz, 2.8mV E. E2 AG : 1kHz, 5.0mV K. M. M2. P Transmit | | | | | | | ±2.4 ~ 3.6kHz • Linear detector LPF: 3KHz HPF: 50Hz De-emphasis: 750μsec |
| 4. TONE | 1) FREQ. : 145.250 E. E2 FREQ. : 145.260 K. M. M2. P HI/LOW SW : LOW Transmit | | | | | | Check | DEV: ±0.5 ~ 1.2kHz • Linear detector LPF: 3KHz HPF: 50kHz De-emphasis: 750μsec |
| 5. TONE E.E2 [1750Hz] | 1) FREQ. : 144.975 HI/LOW SW : LOW Transmit. | | | | | | MIC TONE SW: ON | DEV: ±2.5kHz or more. |

430MHz TRANSMITTER SECTION ADJUSTMENT

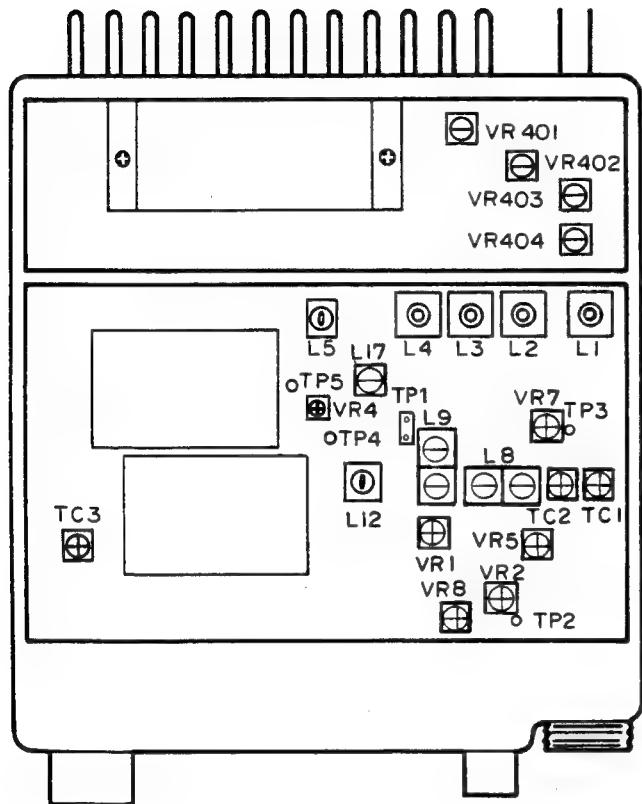
| Item | Condition | Measurement | | | Adjustment | | | Specifications/Remarks |
|----------------------------------|--|--|------------|----------------|--------------|----------------|----------------------|--|
| | | Test-equipment | Unit | Terminal | Unit | Parts | Method | |
| 1. Power | 1) HI POWER FREQ. : 435.000 M. M2. E. E2 FREQ. : 445.000 K. P HI/LOW SW : HI Transmit | Power meter Ammeter | Rear panel | ANT2 (430M) | 430 FINAL | VR401 (CCW) | MAX Read RF meter | 30W or more. All RF meter on. "ON AIR" light on. |
| | 2) APC Transmit. | | | | | | 28W | ±4W or less 8A or less. |
| | 3) MID POWER HI/LOW SW : MID Transmit | | | | TX-RX | VR5 | 10W Read RF meter | ±0.2A 10RF meter on. |
| | 4) LOW POWER HI/LOW SW : LOW Transmit | | | | | | Check | 1.5~2.9W |
| 2. Protection (Current) | 1) FREQ. : 435.000 M. M2. E. E2 FREQ. : 445.000 K. P ANT : Short 430 final unit VR403 : φ Transmit | Ammeter (REAR SIDE)  VR404 (FRONT SIDE) | | | 430 FINAL | VR403 (CCW) | 3.0A | ±0.2A |
| 3. DEV | 1) FREQ. : 434.960 M. M2. T. W FREQ. : 444.960 K AG : 1kHz, 28mV E. E2 AG : 1kHz, 50mV K. P. M. M2 HI/LOW SW : LOW Transmit | Linear detector Oscillo-scope Power meter | Rear panel | NAT2 (430M) | TX-RX | VR3 | ±4.6kHz | ±200Hz Check for detected waveform. • Linear detector LPF: 20KHz HPF: 50Hz De-emphasis: OFF |
| | 2) MIC GAIN AG : 1kHz, 2.8mV E. E2 AG : 1kHz, 5.0mV K. P. M. M2 | | | | | | | ±2.4 ~ 3.6kHz |
| 4. TONE | 1) FREQ. : 435.250 M. M2. E. E2 FREQ. : 445.250 K. P HI/LOW SW : LOW Transmit | | | | | | Check | DEV: ±0.5 ~ 1kHz • Linear detector LPF: 3Hz HPF: 50kHz De-emphasis: 750μsec |
| 5. TONE E.E2 type [1750Hz] | 1) FREQ. : 435.000 HI/LOW SW : LOW Transmit. | | | | | | MIC TONE SW: ON | DEV: ±2.5kHz or more. |
| 6. DTMF K type | 1) FREQ. : 445.100 MIC A and B key : Push at the same time. Transmit. | | | | | | Check | DEV: 2.8~ 4.5kHz |

TM-702A/E

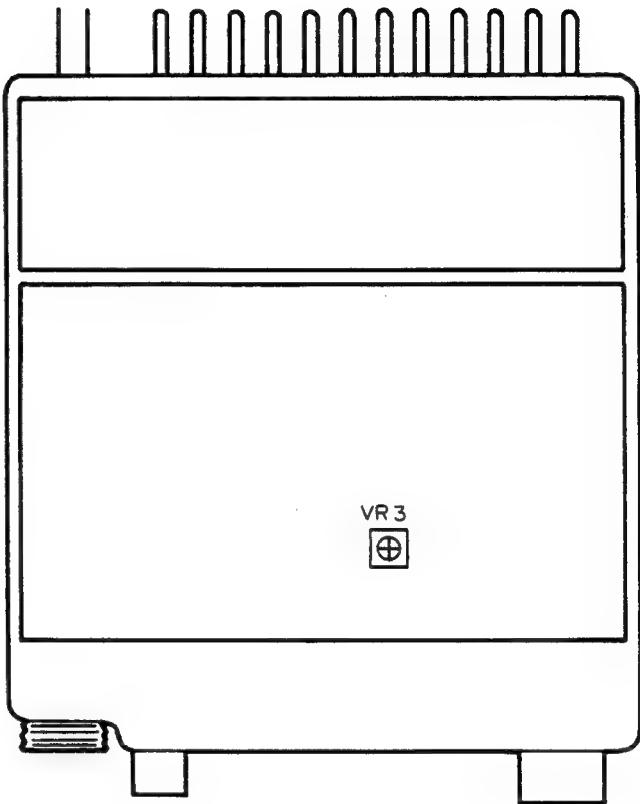
ADJUSTMENT

Adjustment point layout

Top of set



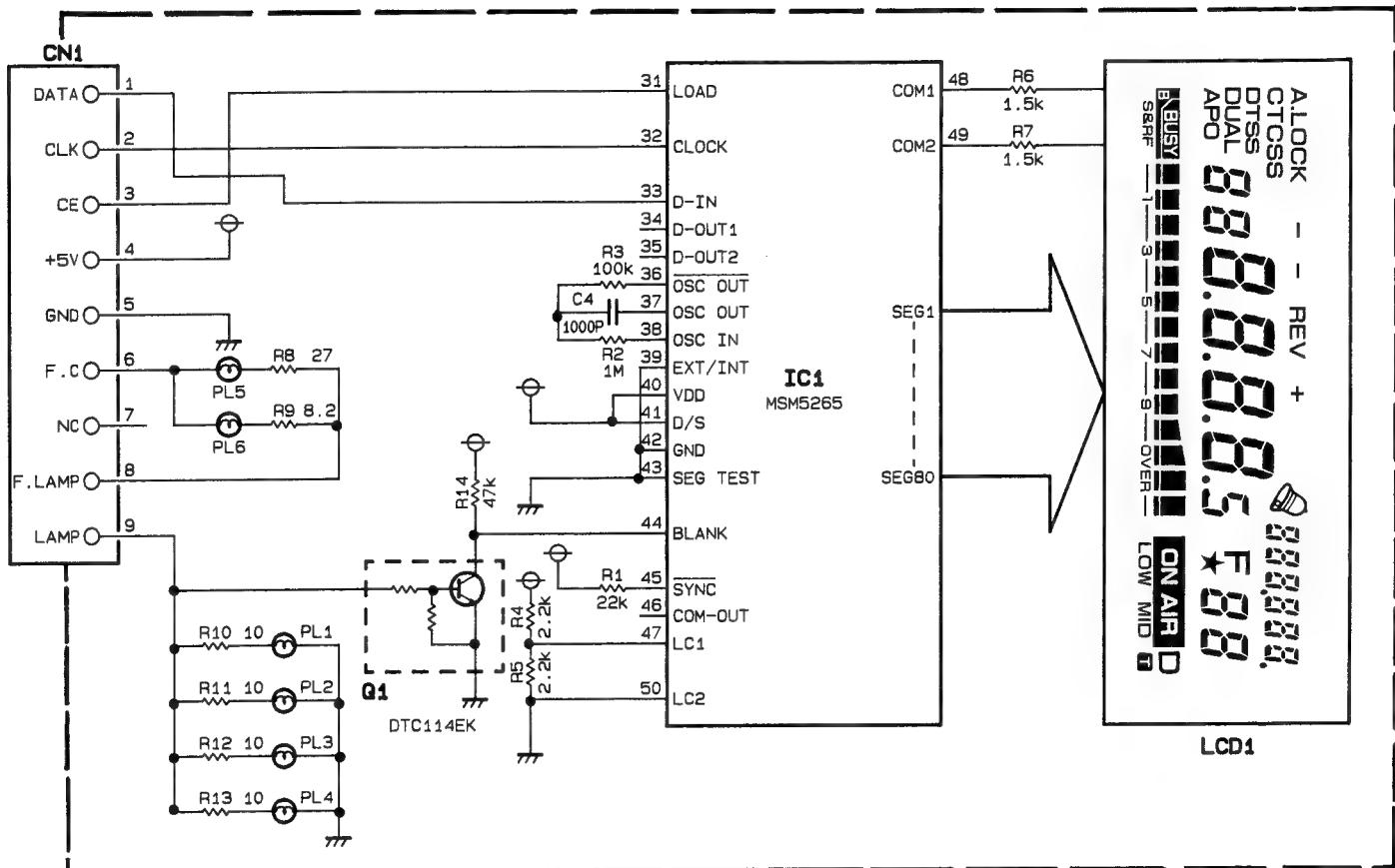
Bottom of set



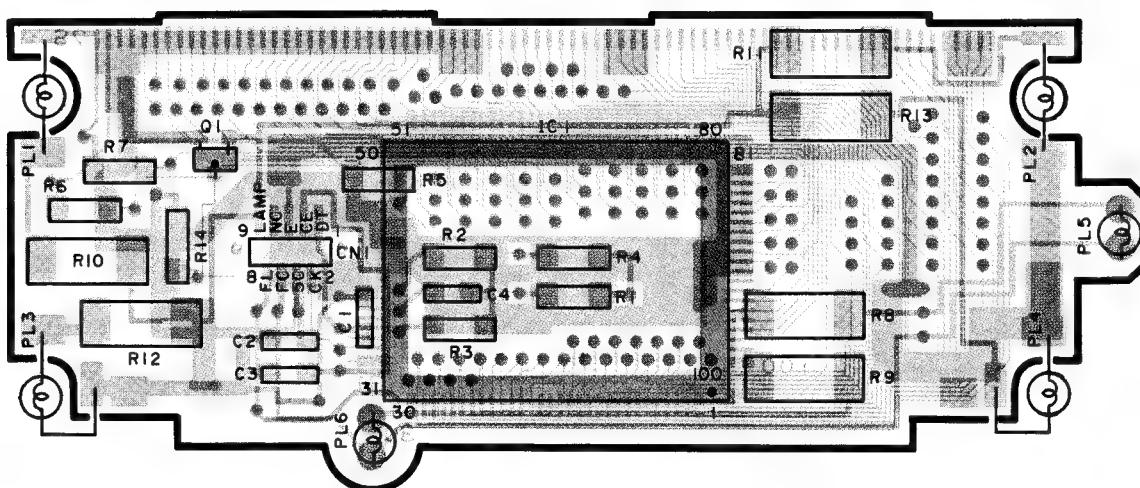
TX-RX unit (X57-3680-XX)
VR1 : Squelch
VR2 : S-meter
VR3 : DEV, VR4 : DEV
VR5, 6, 401, 402 : Transmit output
VR403, 404 : Protection
L1~5 : GAIN (144MHz)
L8, 9 : Helical (430MHz)
L12 : GAIN (430MHz)
L17 : GAIN (144MHz)
TC1, 2 : Helical (430MHz)
TC3 : Transmitt frequency

TM-702A/E

LCD ASS'Y (B38-0348-05)



LCD ASS'Y (B38-0348-05) Component side view

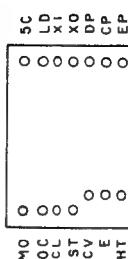


A B C D E

TM-702A/E

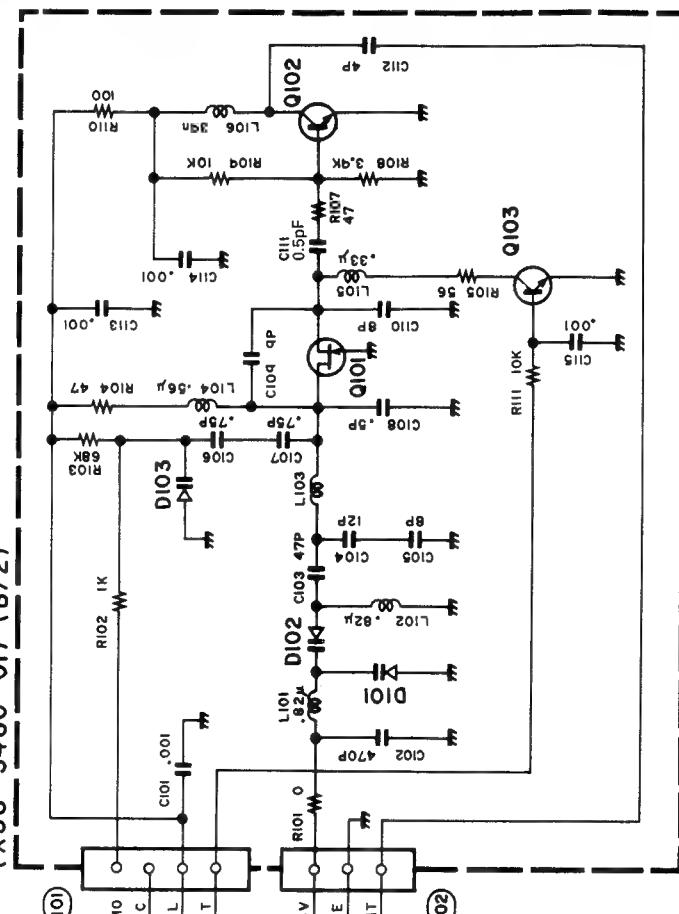
CIRCUIT DIAGRAM

430PLL (X58-3480-01)

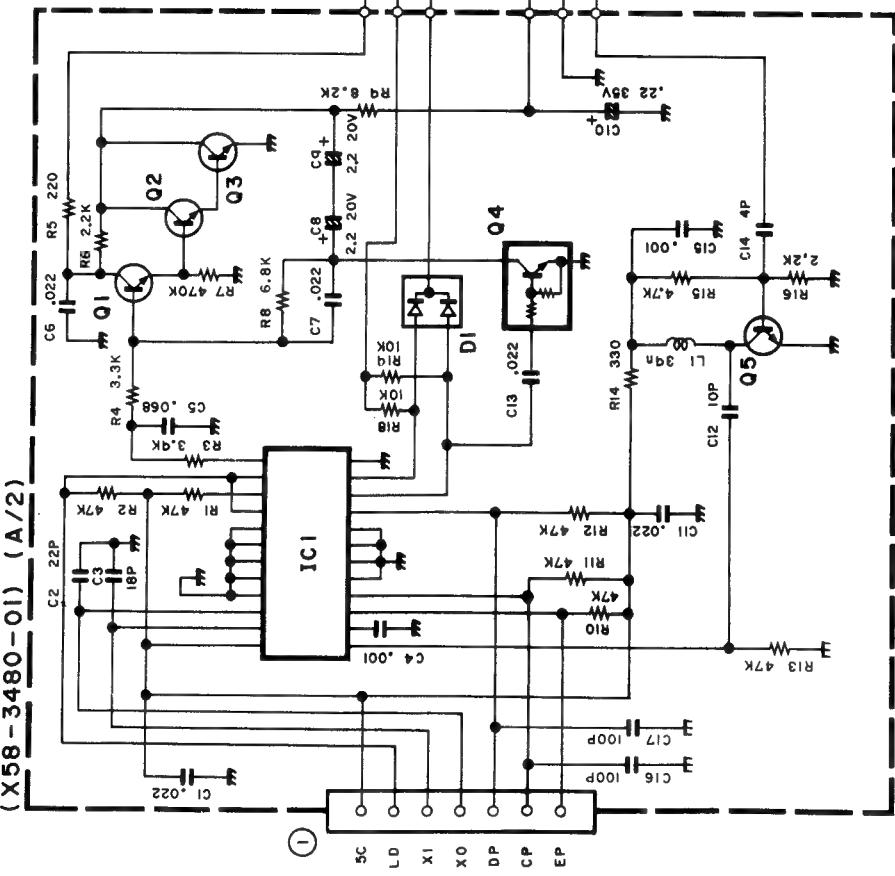


(TOP VIEW)

(X58-3480-01) (B/2)



(X58-3480-01) (A/2)



(X58-3480-01) (A/2)

IC 1 : M54959FP
 Q1~3 : 2SC3324 (B)
 Q4 : DTC144EK
 Q5 : 2SC2714 (Y)
 D1 : ISS184

Unused numbers

C18-100
 R17,20-100,106

(X58-3480-01) (B/2)

| | |
|-----------|---------------|
| Q101 | : 2SK682 |
| Q102 | : 2SC3120 |
| Q103 | : 2SC3324 (G) |
| D101, 102 | : IT33C |
| D103 | : ISV164 |

A

B

C

D

E

PC BOARD VIEW

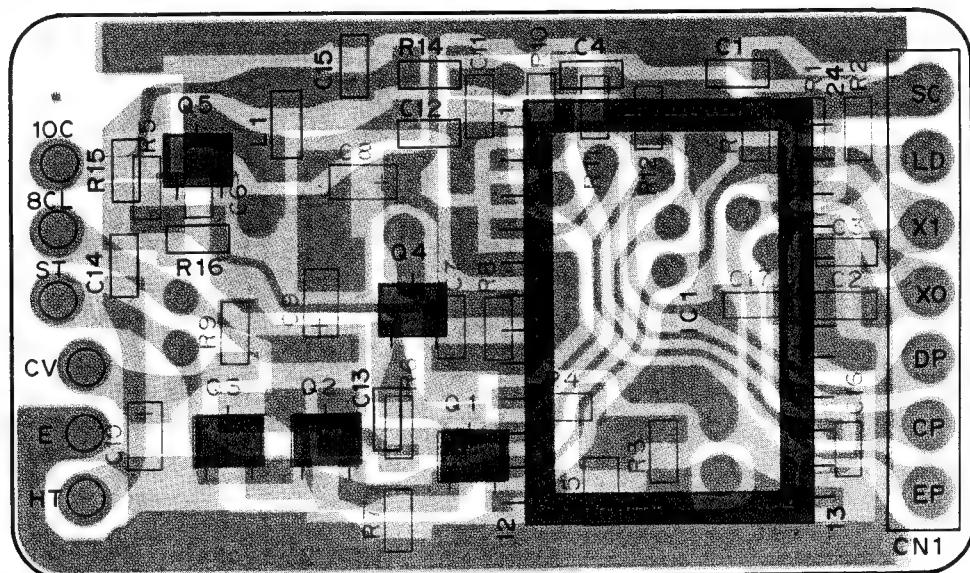
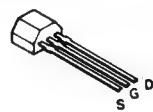
TM-702A/E

430PLL (X58-3480-01) (A/2) Component side view

DTC144EK
2SC2714(Y)
2SC3120
2SC3324(B, G)



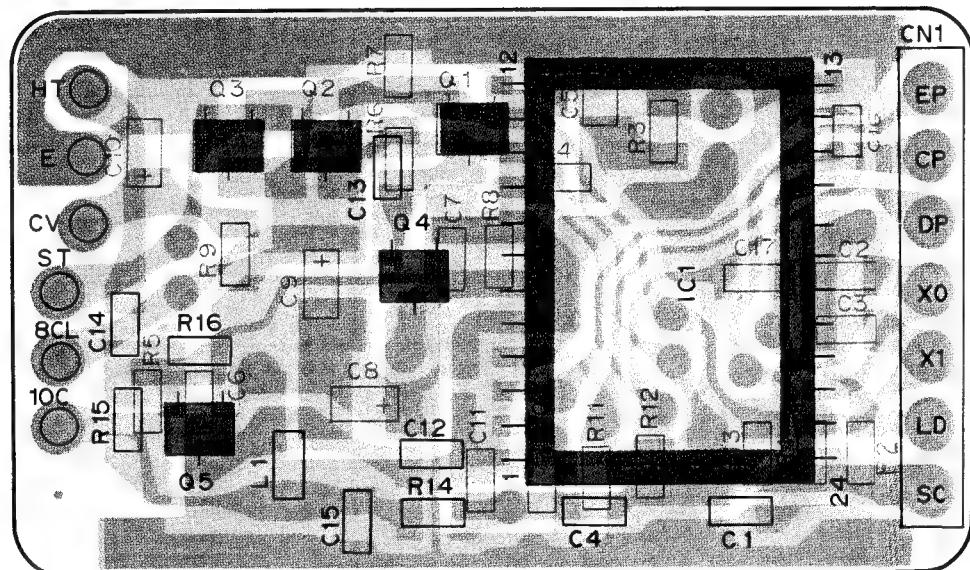
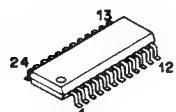
2SK582



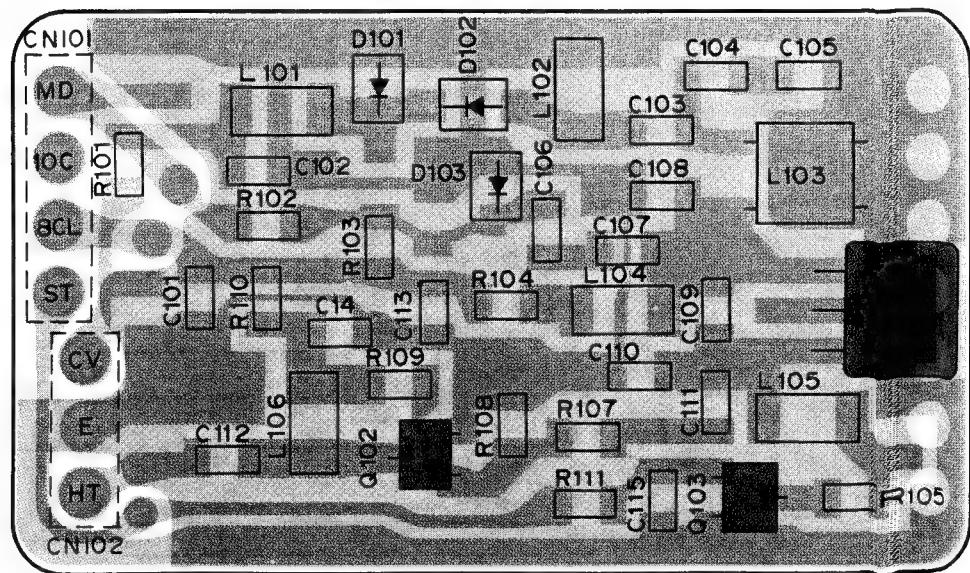
IC1 : M54959FP Q1~3 : 2SC3324 (B) Q4 : DTC144EK Q5 : 2SC2714 (Y) D1 : 1SS184

430PLL (X58-3480-01) (A/2) Foil side view

M54959FP



430PLL (X58-3480-01) (B/2) Component side view



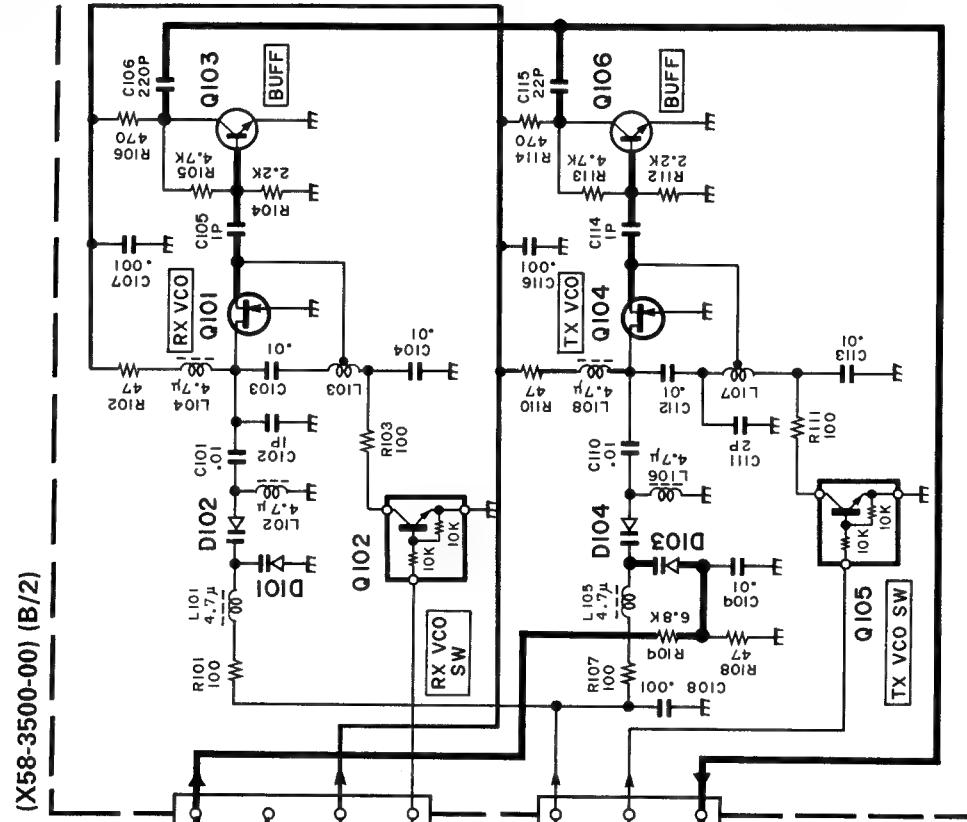
Q101 : 2SK582 Q102 : 2SC3120 Q103 : 2SC3324 (G) D101,102 : IT33C D103 : 1SC16

A B C D E

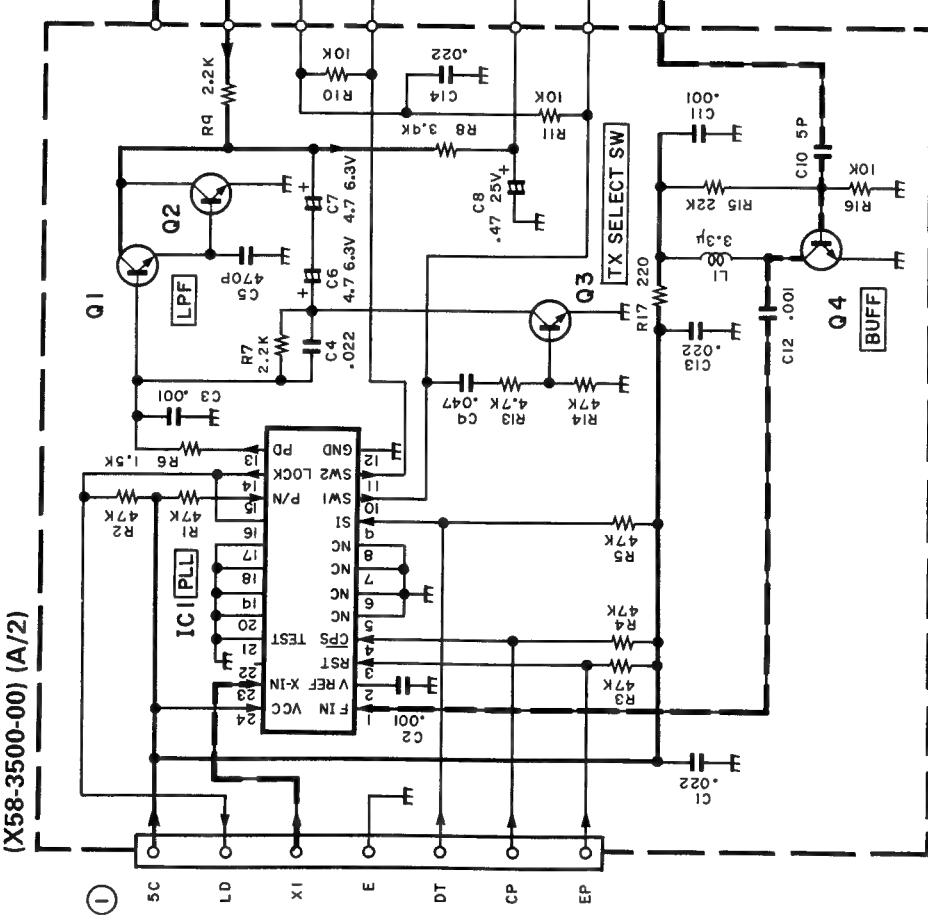
TM-702A/E CIRCUIT DIAGRAM

144PLL (X58-3500-00)

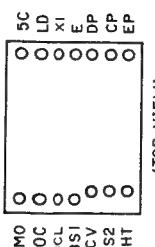
0~21 : M, 0~22 : M2, 2~71 : E, 2~72 : E2



(X58-3500-00) (B/2)



(X58-3500-00) (A/2)



(TOP VIEW)

(X58-3500-00) (B/2)
 Q101,104 : 2SK508NV(K52)
 Q102,105 : DTC114EK
 Q103,106 : 2SC3120

D101 ~ 104 : ISV166

Unused numbers
 C15~100
 R12,18~100

(X58-3500-00)(A/2)
 IC1 : M54959FP
 Q1,2 : 2SC3324(B)
 Q3 : 2SC2712(Y)
 Q4 : 2SC2714(Y)

A

B

C

1

E

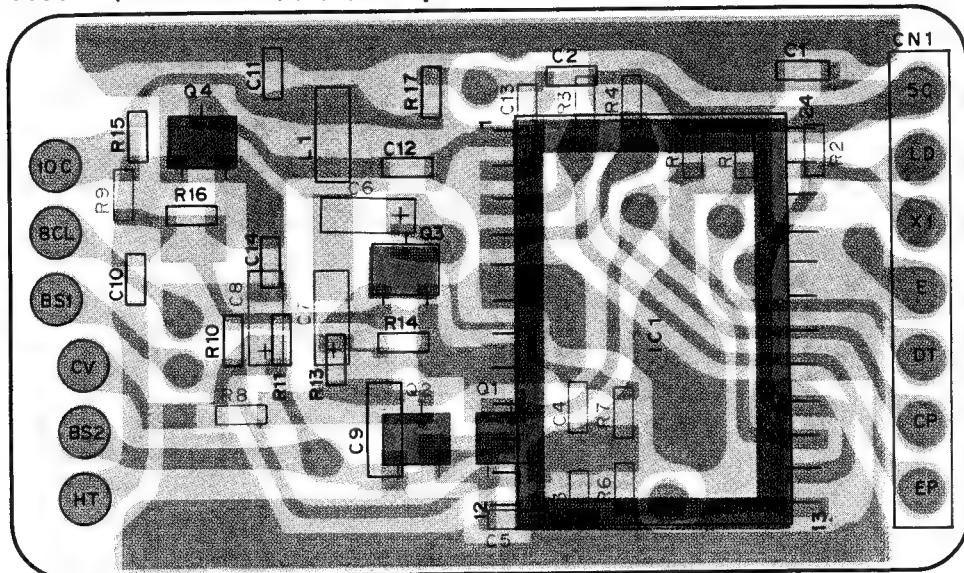
PC BOARD VIEWS / CIRCUIT DIAGRAMS TM-702A/E

144 PLL (X58-3500-00) (A/2) Component side view 0~21 : M, 0~22 : M2, 2~71 : E, 2~72 : E2

DTC114EK
2SC2712(Y)
2SC2714(Y)
2SC3120
2SC3324(B,G)



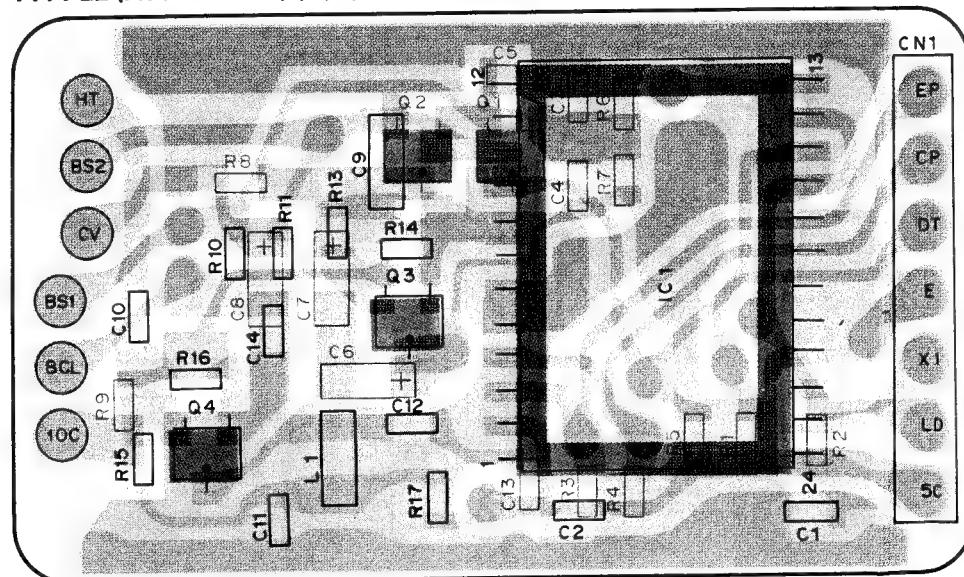
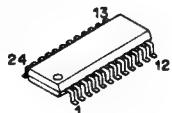
2SK508NV(K52)



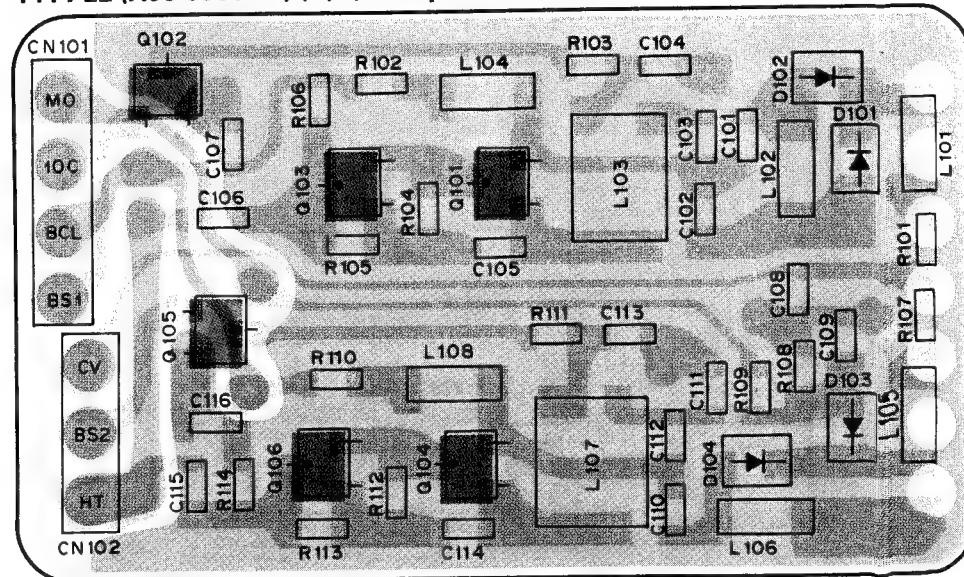
IC1 : M5459FP Q1,2 : 2SC3324 (B) Q3 : 2SC2712 (Y) Q4 : 2SC2714 (Y)

144 PLL (X58-3500-00) (A/2) Foil side view

M54959FP



144 PLL (X58-3500-00) (B/2) Component side view



Q101,104 : 2SK508NV (K52) Q102, 105 : DTC114EK Q103,106 : 2SC3120 D101~104 : 1SV166

A

8

C

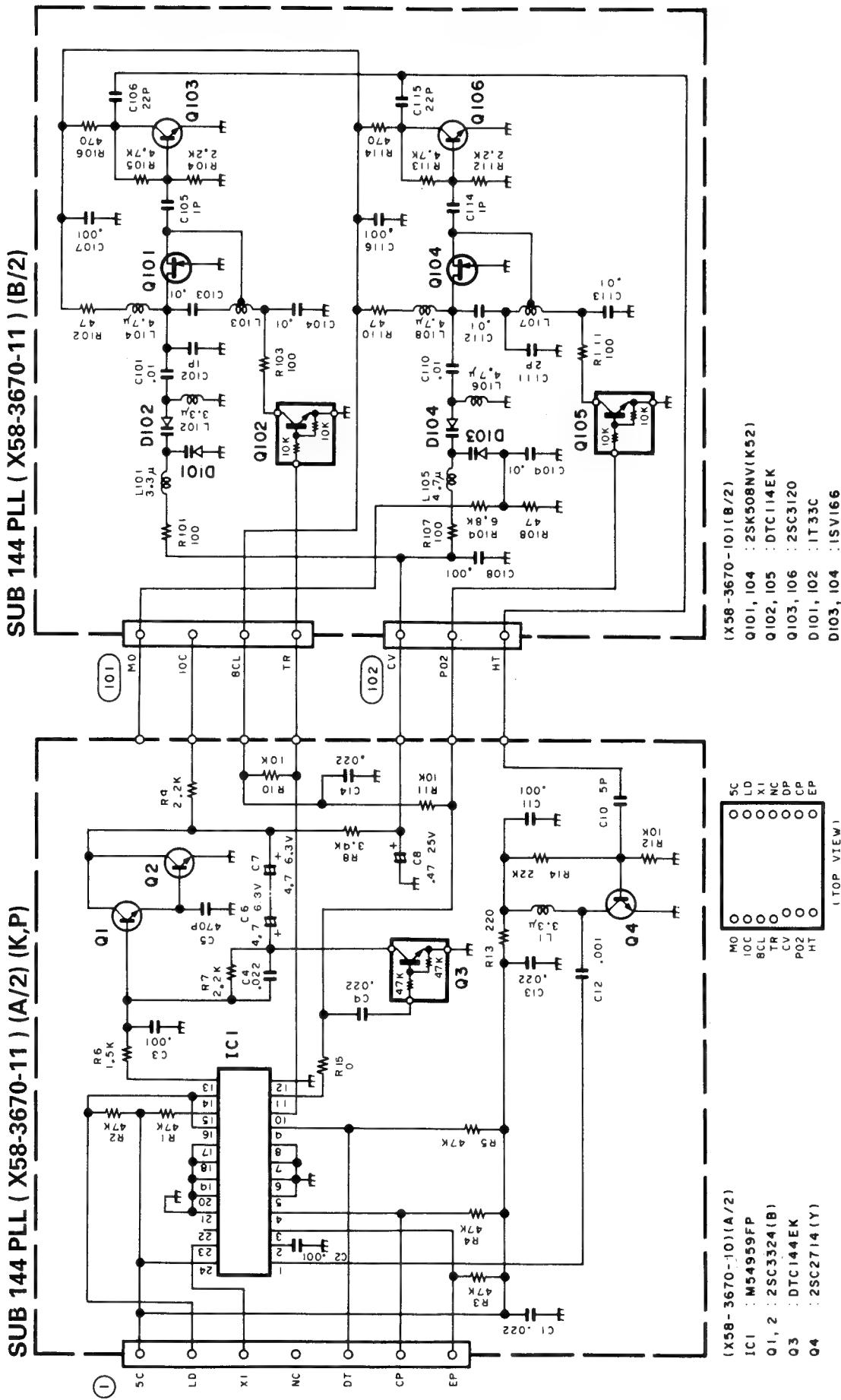
3

E

TM-702A/E

CIRCUIT DIAGRAMS

144PLL (X58-3670-11)-11 : K. P



A

B

C

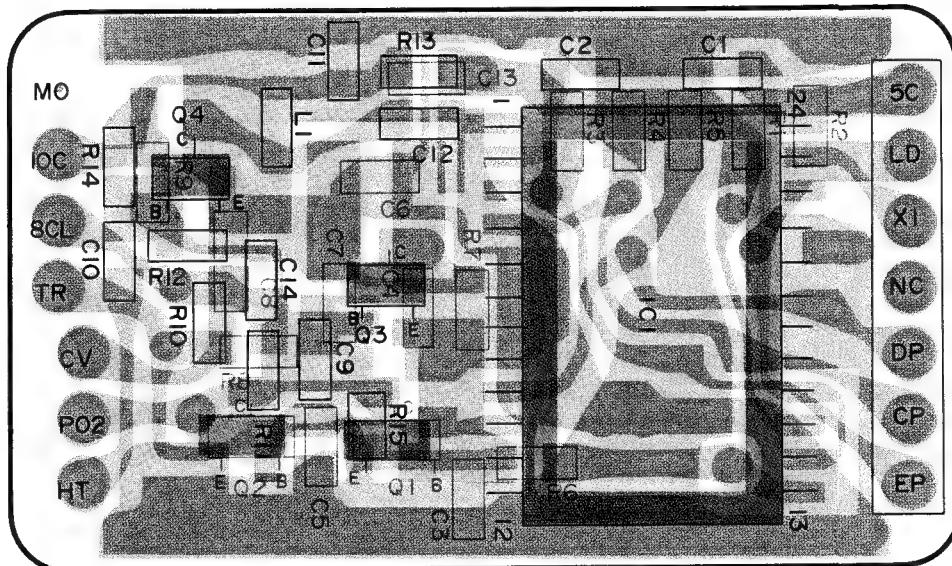
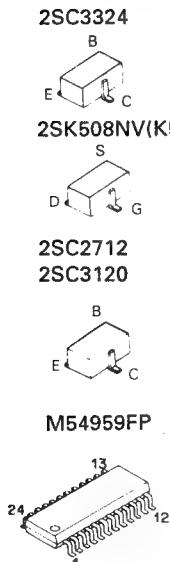
D

E

PC BOARD VIEWS / CIRCUIT DIAGRAMS

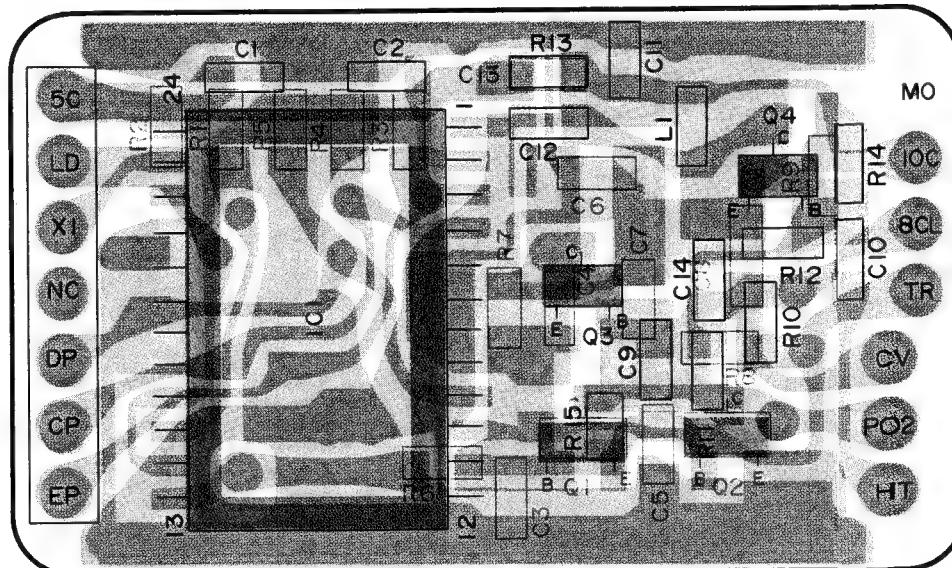
TM-702A/E

144PLL (X58-3670-11) (A/2) Component side view-11 : K. P

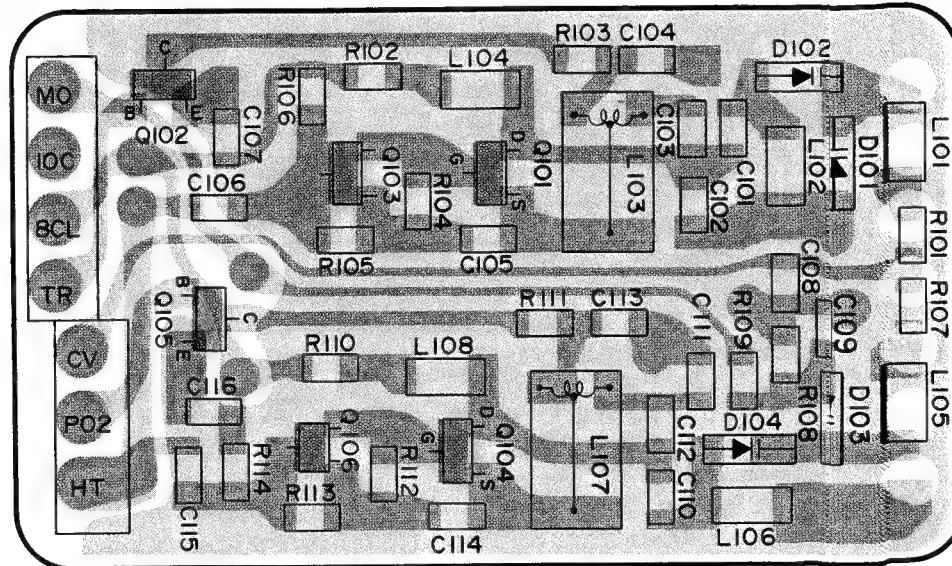


IC1: M54959 FP Q1,2:2SC3324(B) Q3:DTC144EK Q4:2SC2714(Y)

144PLL (X58-3670-11) (A/2) Foil side view



144PLL (X58-3670-11) (B/2) Component side view

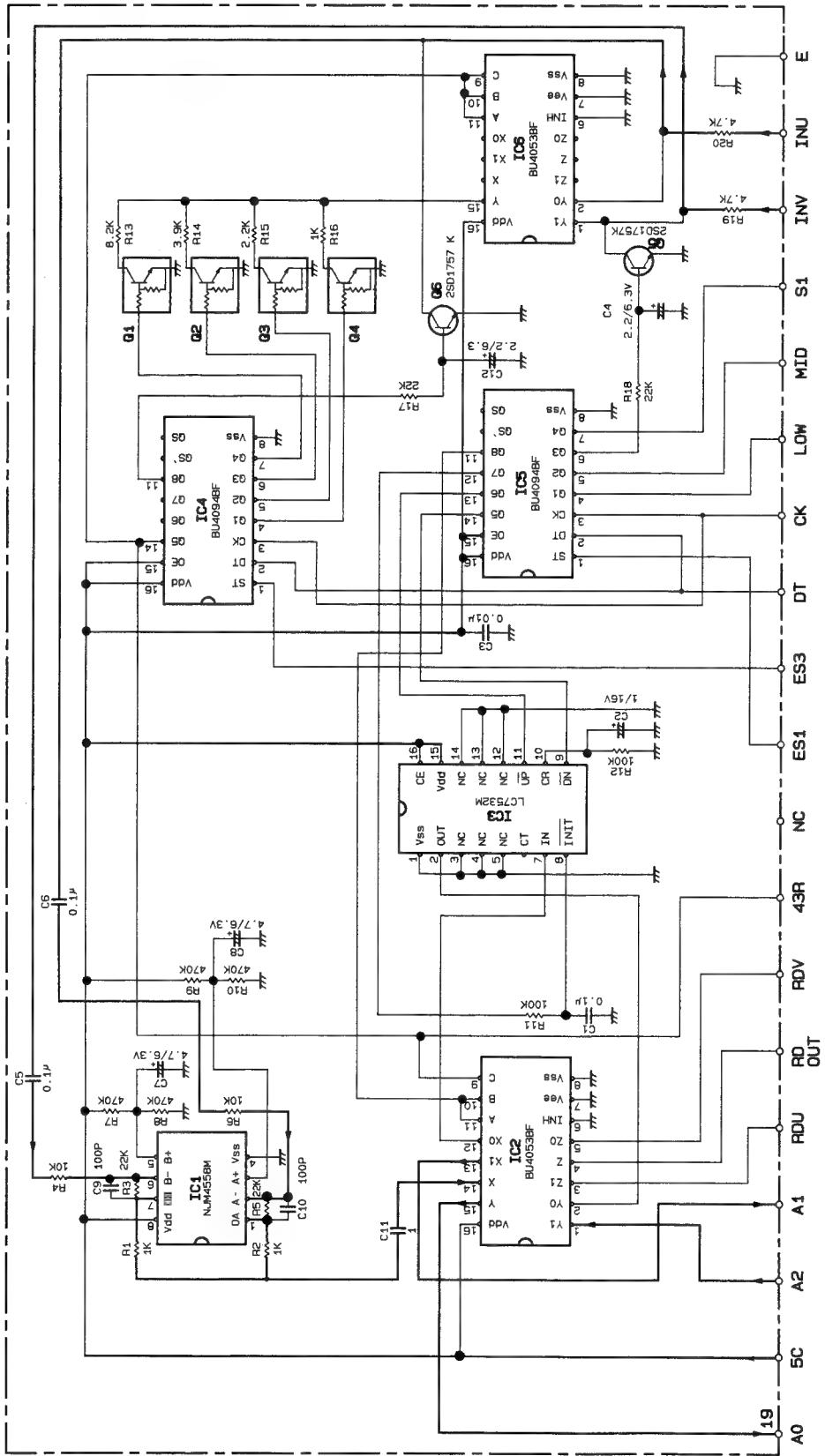


Q101,104: 2SK508NV(52) Q103,106:2SC3120 D101,102:1T33C D103,104:1SV166

TM-702A/E

CIRCUIT DIADRAM

ELE VOL (X59-3800-00)



IC1 : NJM4588M Q1~4 : DTC149EK
 IC2.6 : BU4059BF Q5.6 : 2SD1757K
 IC3 : LC7532M
 IC4.5 : BU4094BF

A

B

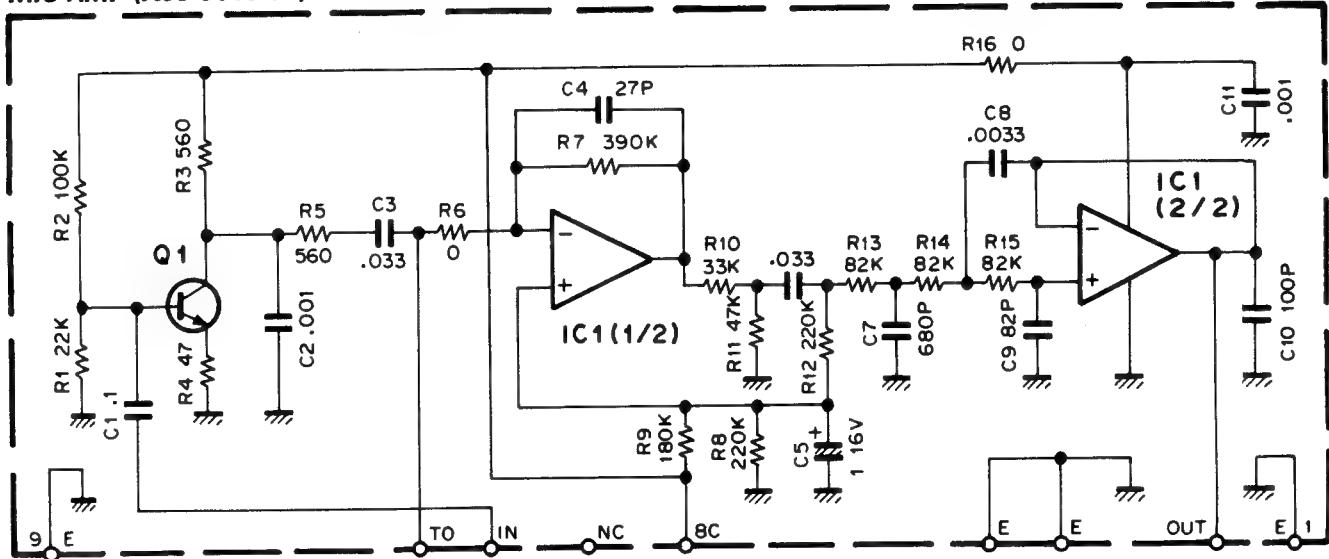
C

D

E

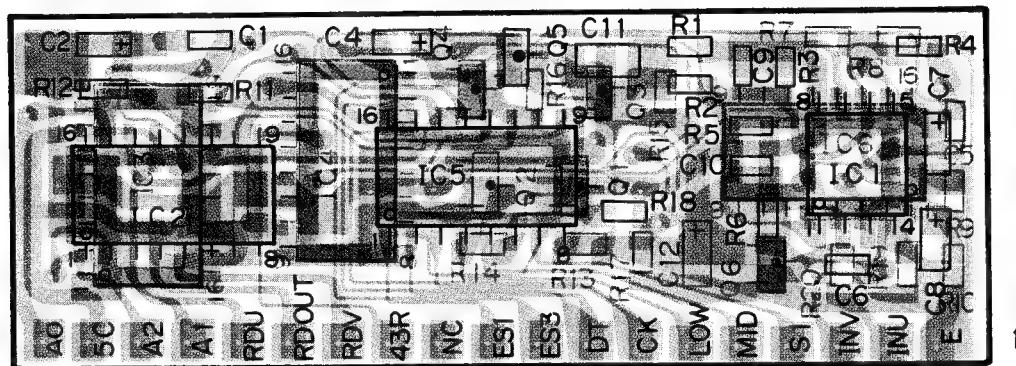
CIRCUIT DIAGRAM/PC BOARD VIEWS TM-702A/E

MIC AMP (X59-3610-00)



Q1 : 2SC4116 (GR) IC1 : NJM4558M

ELE VOL (X59-3800-00) Component side view

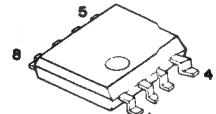


IC1 : NJM4558M IC2.6 : BU4053BF IC3 : LC7532M IC4.5 : BU4094BF Q1 ~ 4 : DTC143EK Q5.6 : 2SD1757K

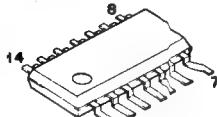
2SC4116(Y)
2SD1757(Y)



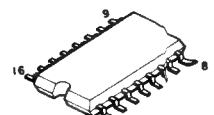
NJM4558M



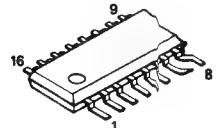
MN4066BS



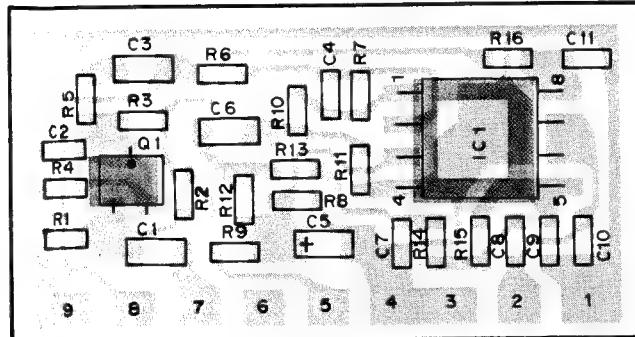
MC14094B



LC7532M



MIC AMP (X59-3610-00) Foil side view



Q1 : 2SC4116(Y) IC1 : NJM4558M

A

B

6

4

11

TM-702A/E

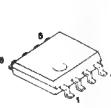
PC BOARD VIEWS

TX-RX UNIT (X57-368X-XX) (A/4)

0-11: K, P, 0-21: M, 0-22: M2 (TM-702A), 2-71: E, 2-72: E2 (TM-702E)

Component side view

DTC114EK LA5010M
2SA1162 (Y)
2SC2712 (Y)
2SC2714 (Y)
2SD1757 (K)
B, E, C



2SK208 (O) TA7787AF
BU4053BF



3SK131 (V12)
3SK184 (S)



2SK582



2SB1119S
2SB1302S



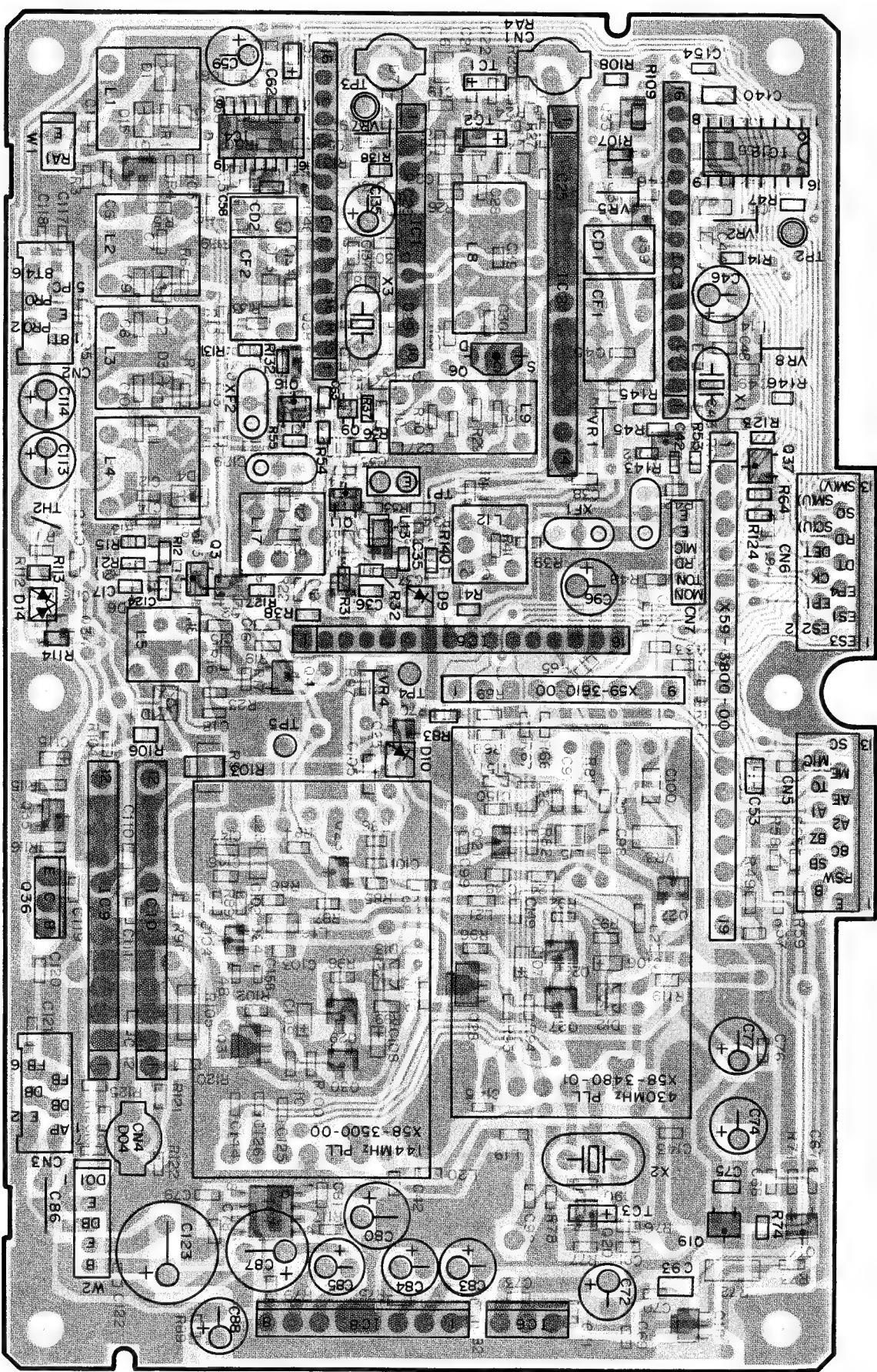
2SA1307



μPC78M08H

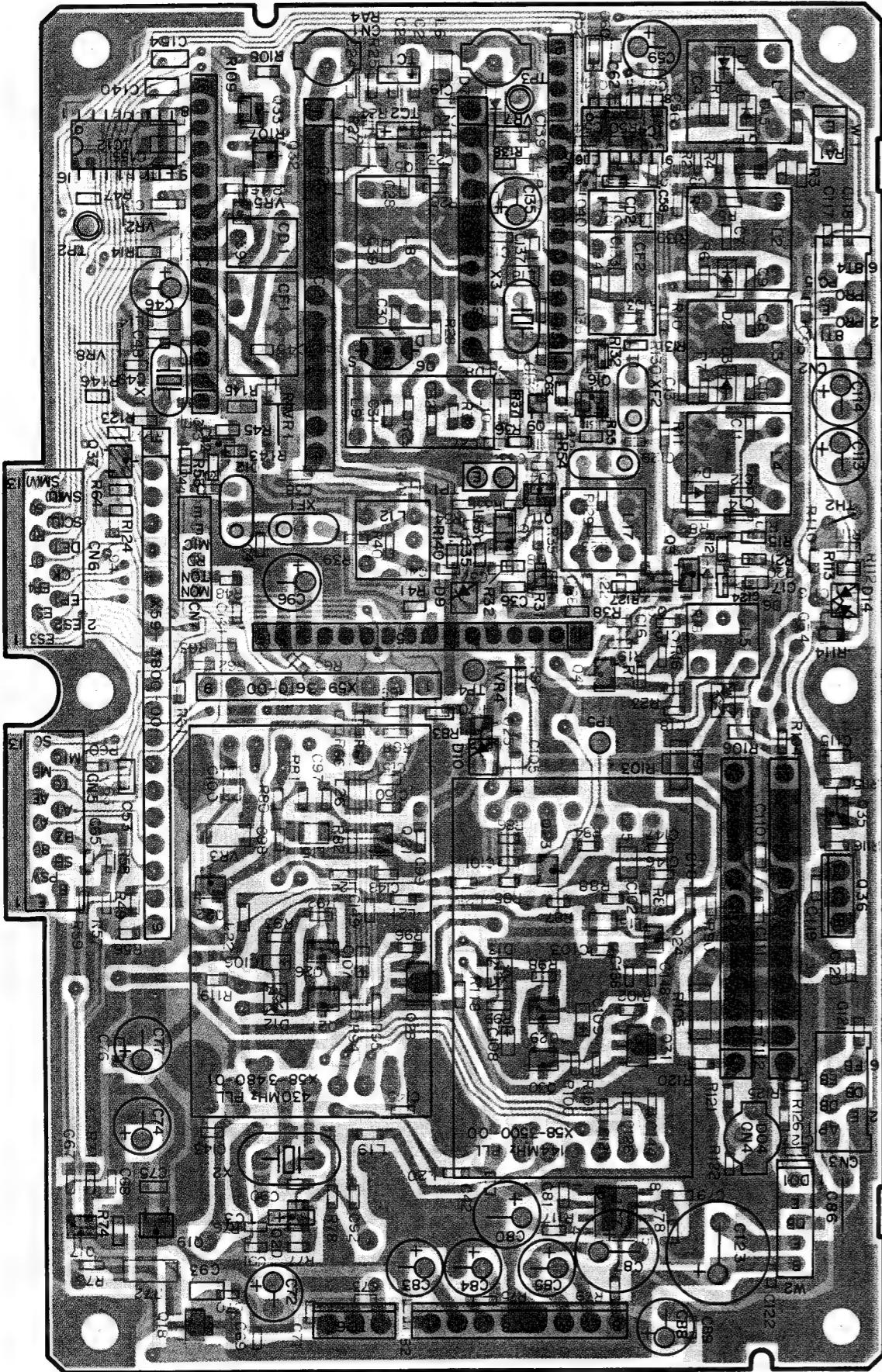


μPC1241H



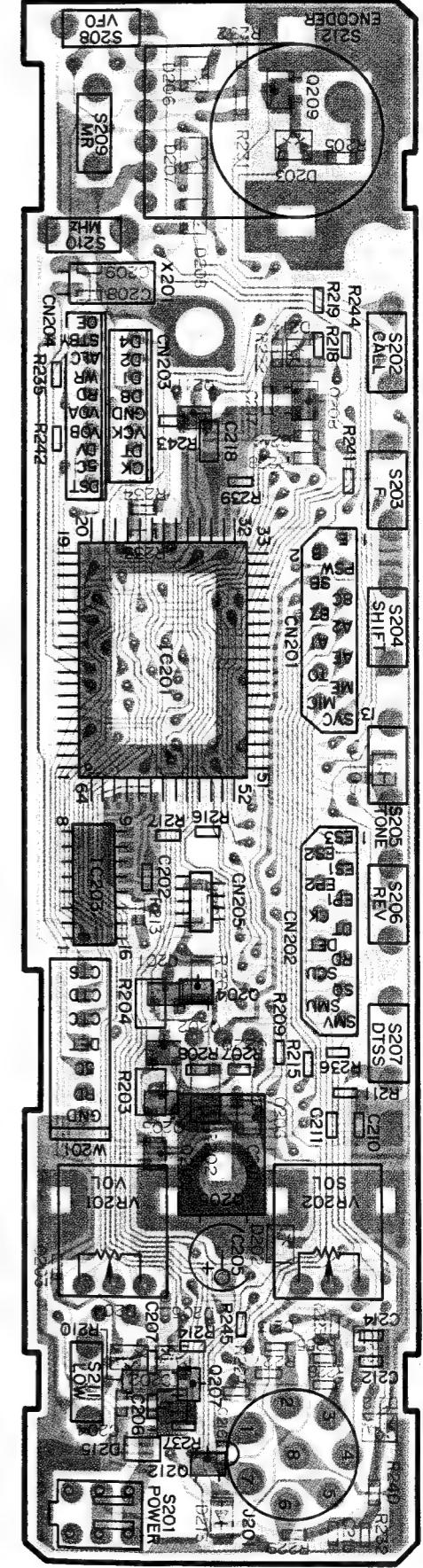
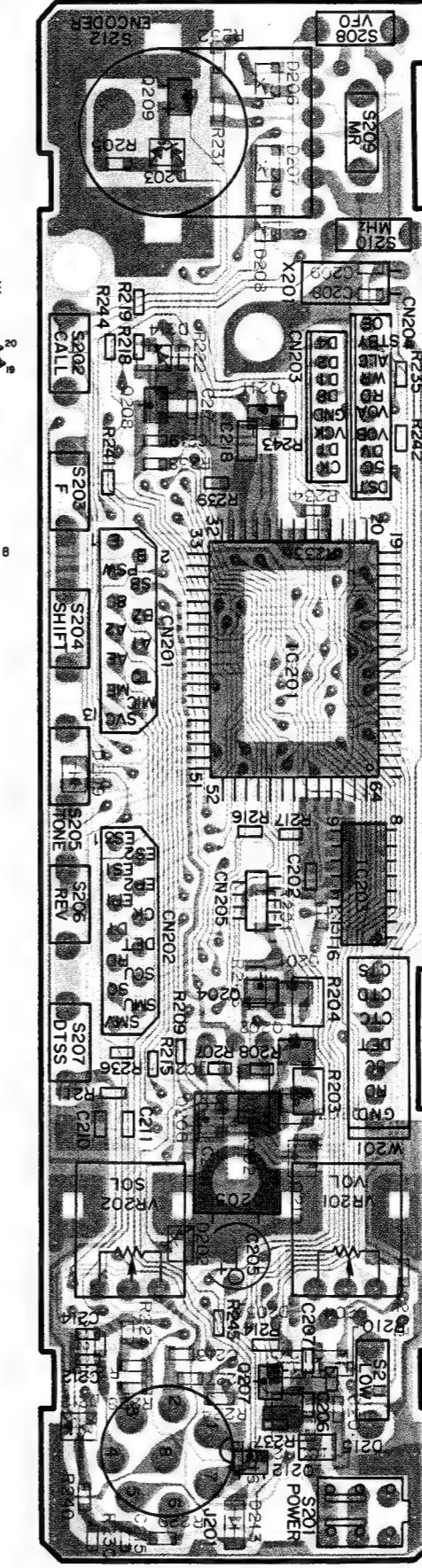
PC BOARD VIEWS

TX-RX UNIT (X57-368X-XX) (A/4) O-11: K, P, O-21: M, O-22: M2 (TM-702A), 2-71: E, 2-72: E2 (TM-702E)
Foil side view



IC3, 11 : KCD04 IC4 : TA7787AF IC5 : KCC03 IC6 : UPC78M08H IC7 : LA5010M IC8 : UPC1241H IC9 : KCB05 IC10 : KCB06 IC12 : BU4053BF
 Q1, 5, 7 : 3SK184 (S) Q2 : 3SK131 (V12) Q3, 4, 8, 15, 22, 25, 27, 30, 32, 33 : DTC114EK Q6 : 2SK582 Q9 : FMC3 Q12, 20, 21, 24, 38 : 2SC2714 (Y)
 Q14, 17, 19, 26, 29, 35 : 2SC2712 (Y) Q16, 23 : 2SK208 (Y) Q18 : 2SB1302S Q28, 31 : 2SB119S Q34 : 2SA1162 (Y) Q36 : 2SA1307 (Y)
 Q37 : 2SD175K Q39, 40 : 2SJ144 (GR) D1 ~ 4, 15 : ISV164 (K, P), ISV166 (M, M2, E, E2) D6 : ISV166 D7 : HSK277 D9, 10 : ISV128
 D11 : ISS268 D12, 14 : ISS194

TX-RX UNIT (X57-368X-XX) (B/4) O-11: K, P, 0-21: M, 0-22: M2 (TM-702A), 2-71: E, 2-72: E2 (TM-702E)
Component side view **Foil side view**



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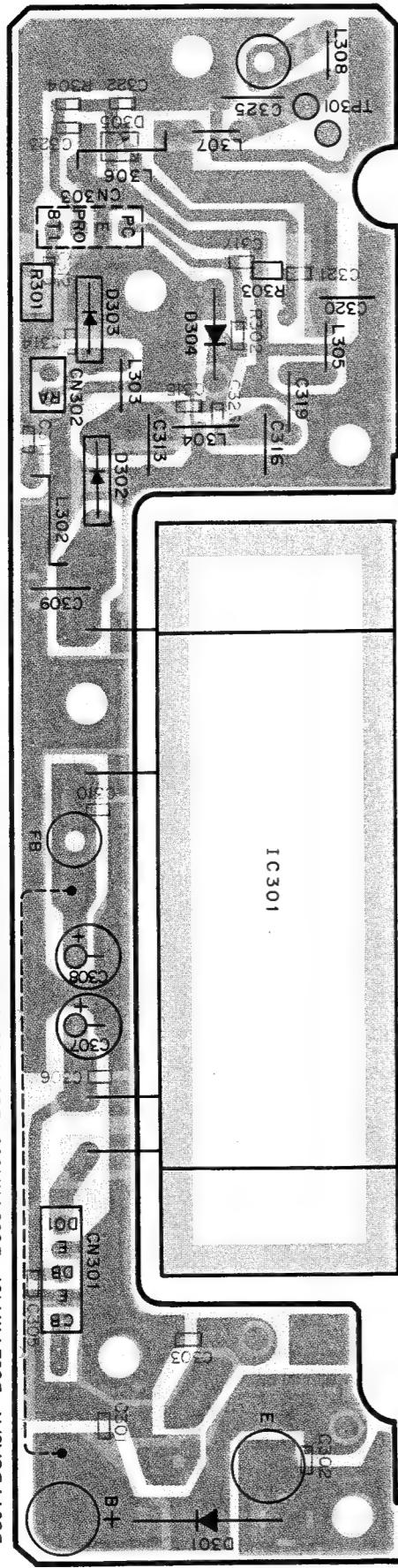
TM-702A/E

PC BOARD VIEWS

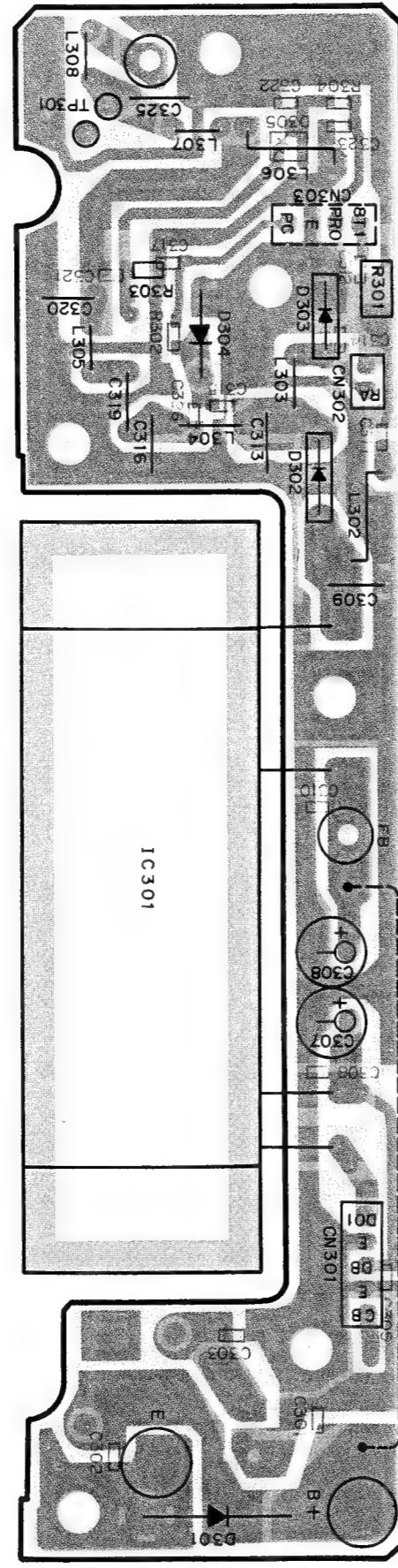
TX-RX UNIT (X57-368X-XX) (C/4)

O-11: K, P, 0-21: M, 0-22: M2 (TM-702A), 2-71: E, 2-72: E2 (TM-702E)

Component side view



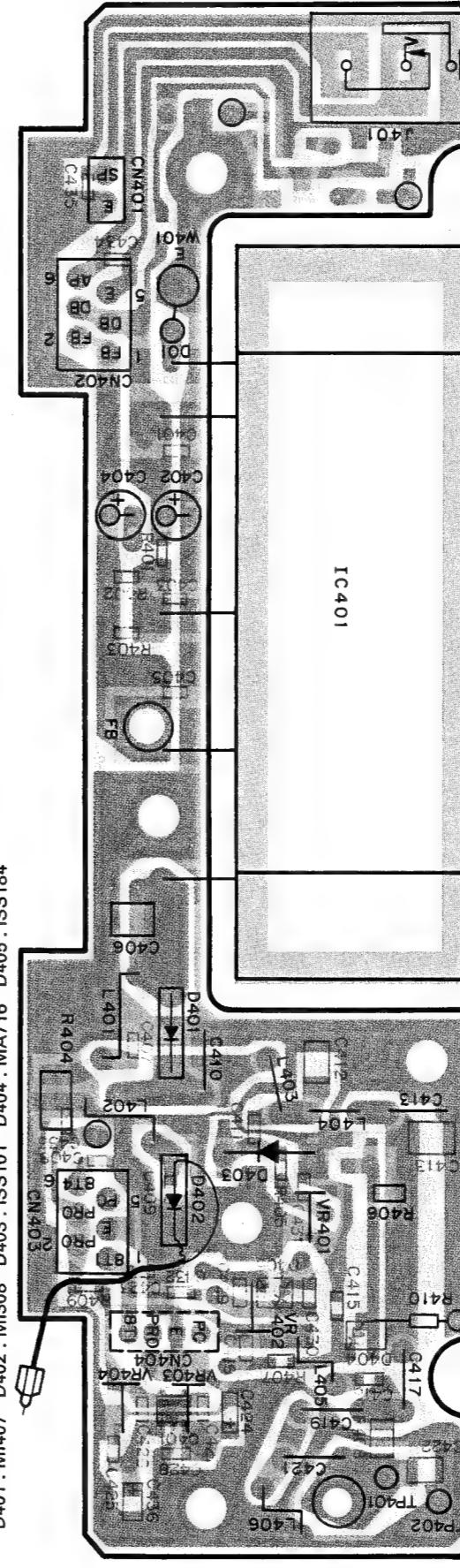
Foil side view



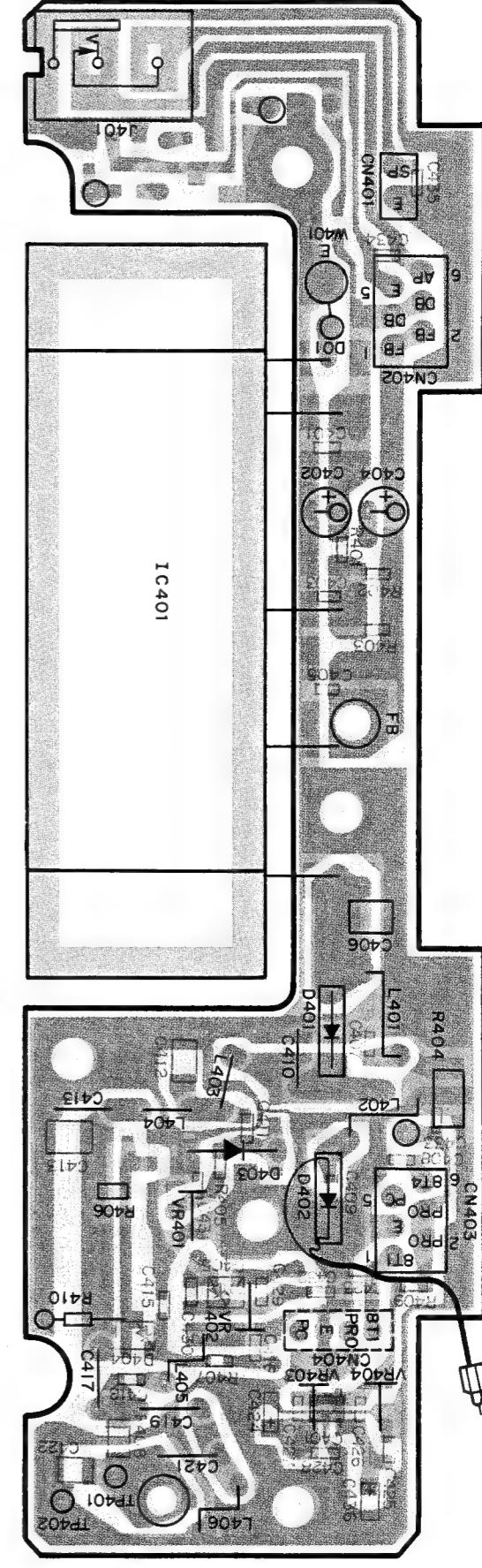
TX-RX UNIT (X57-368X-XX) (D/4)

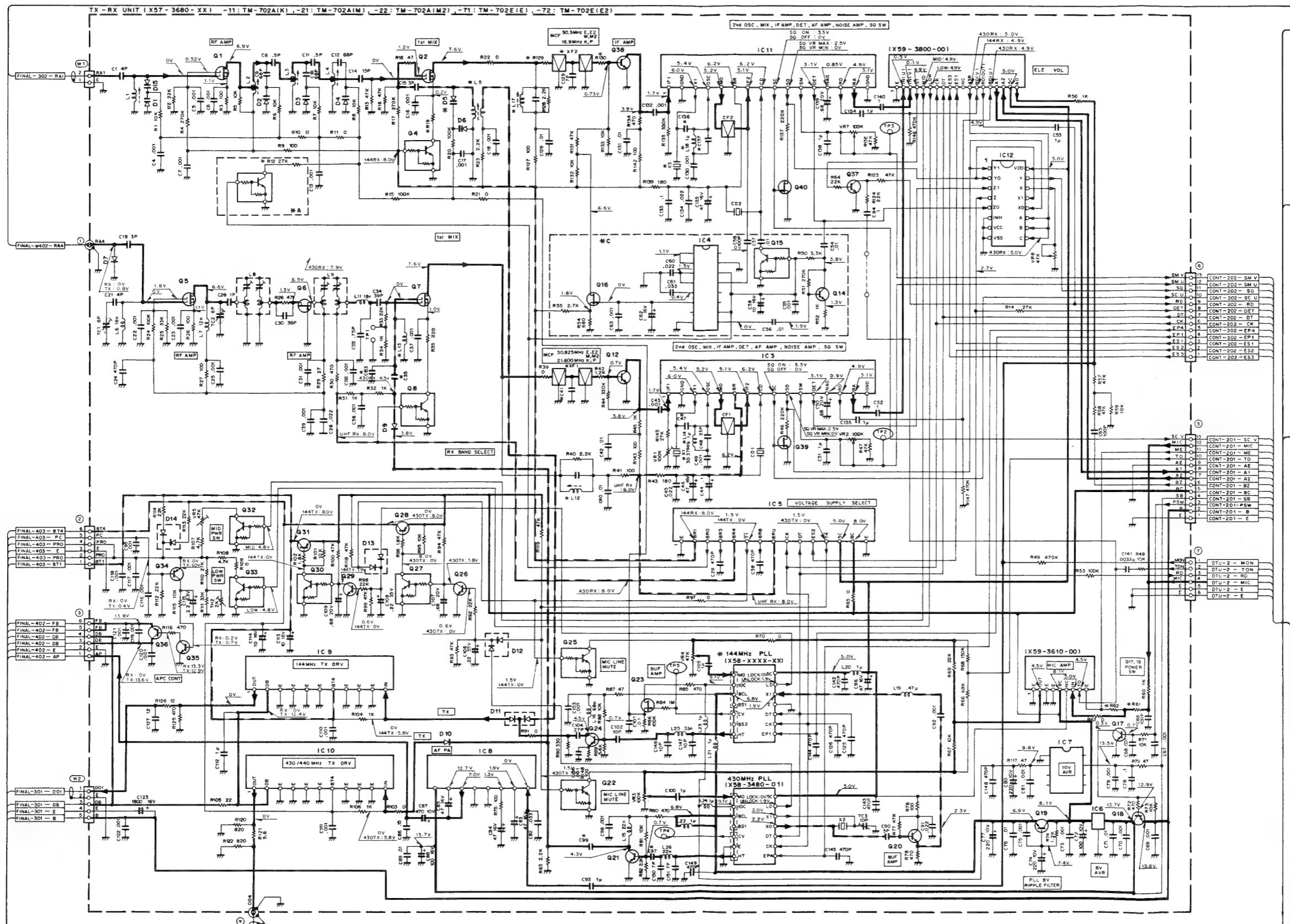
O-11: K, P, O-21: M, O-22: M2 (TM-702A), 2-71: E, 2-72: E2 (TM-702E'

Component side view

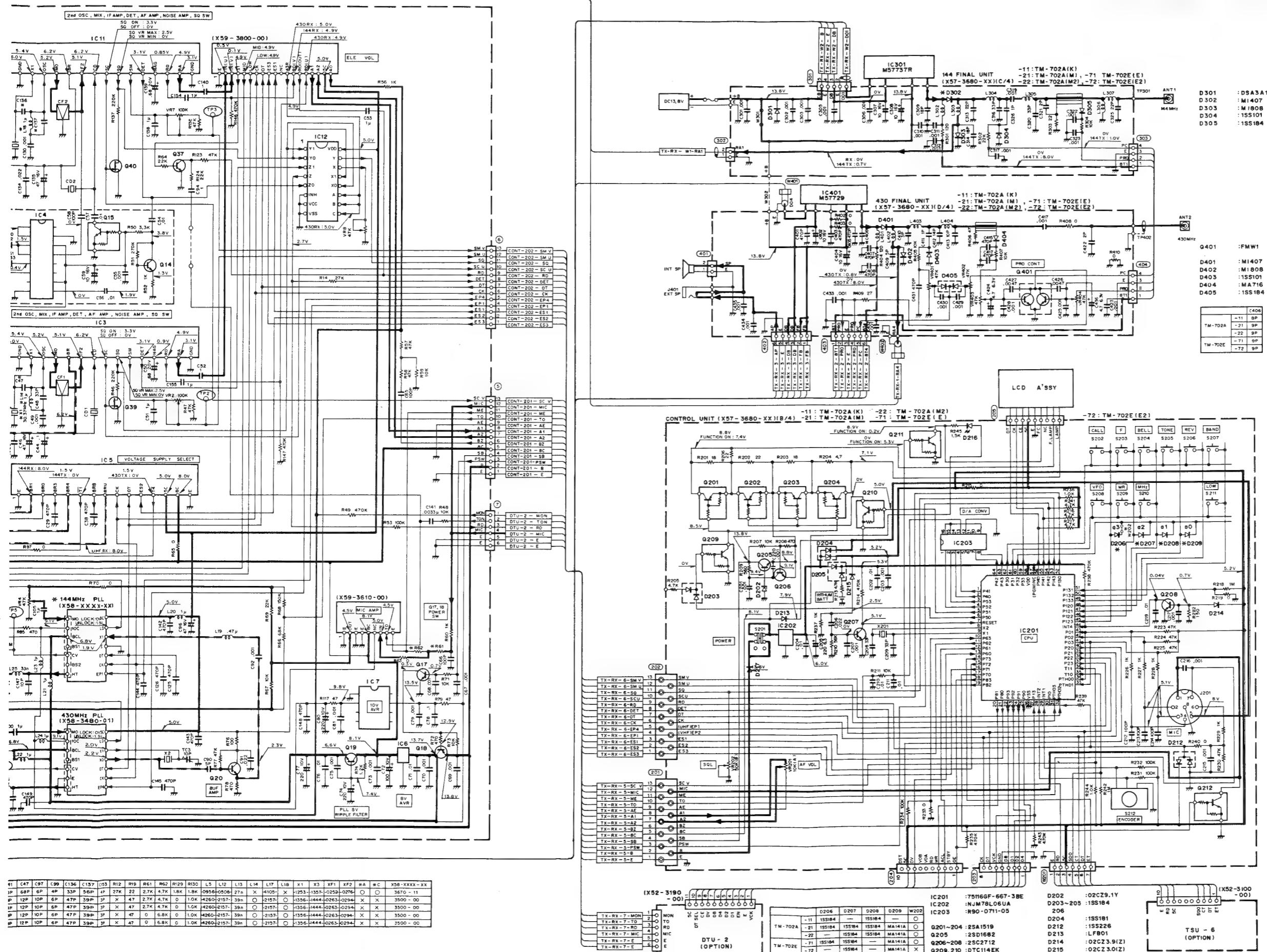


Foil side view



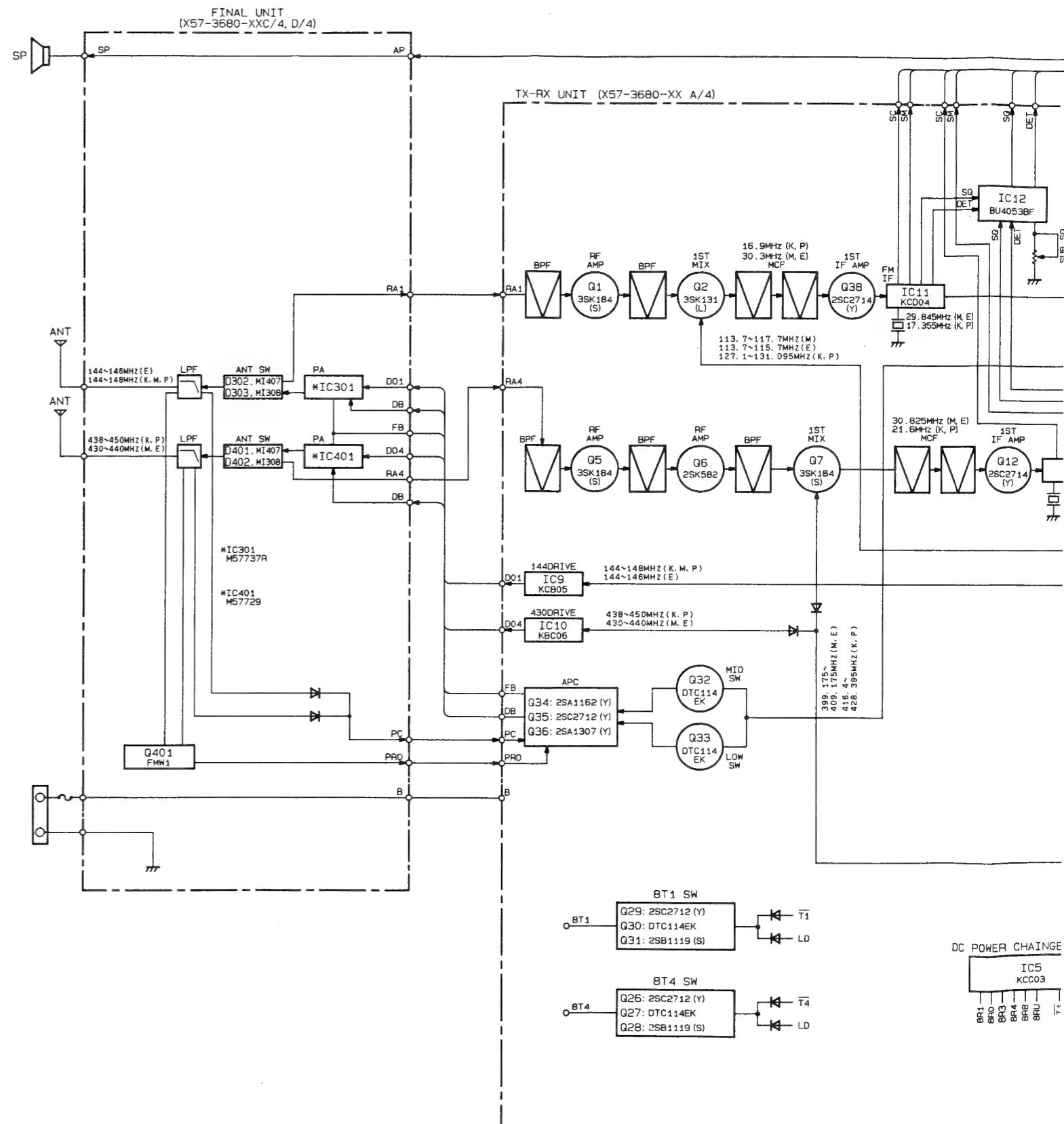


SCHEMATIC DIAGRAM TM-702A/E

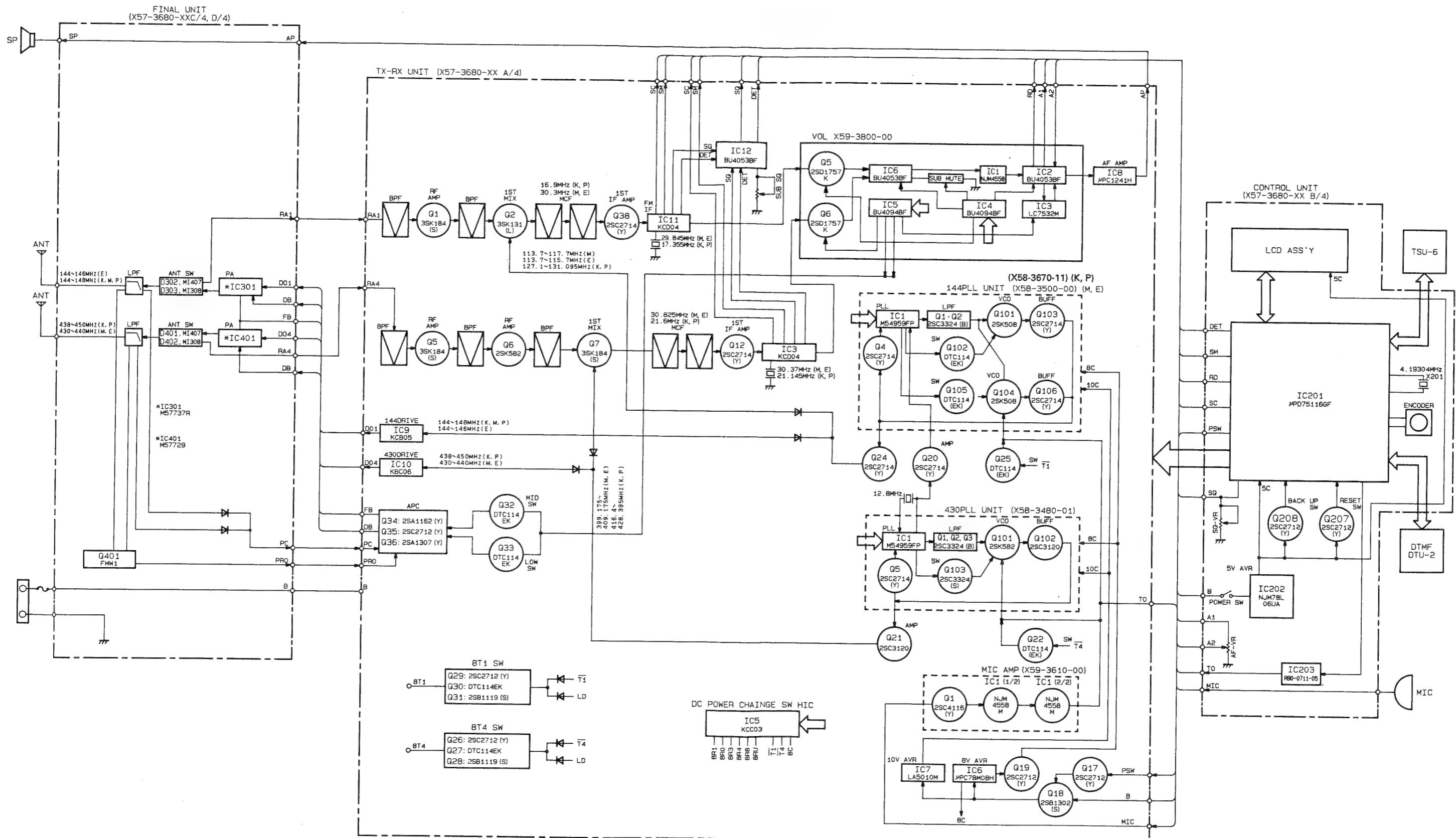


| Connector No. | Terminal No. | Terminal No. | Terminal Functions |
|---|--------------|--------------|--|
| TX-RX UNIT (X57-3680-XX) (A4) | | | |
| CN1 | 1 | RA4 | 430MHz ANT input |
| CN2 | 1 | 8T1 | 8V in transmit mode (144MHz) |
| | 2 | PRO E | Protection |
| | 3 | PRO PC | GND |
| | 4 | 8T4 | Protection input |
| | 5 | | APC input |
| | 6 | | 8V in transmit mode (430MHz) |
| CN3 | 1 | AP E | Audio output (from AF PA IC) |
| | 2 | DB | GND |
| | 3 | DB | Drive + B |
| | 4 | FB | Drive + B |
| | 5 | FB | Final + B (13.8V) |
| | 6 | FB | Final + B (13.8V) |
| CN4 | 1 | DO4 | 430MHz drive output |
| CN5 | 1 | E B | GND |
| | 2 | | + 13.8V |
| | 3 | PSW | Power switch control output (from microprocessor) |
| | 4 | SB | SWICHERD B |
| | 5 | 8C | Common + 8V |
| | 6 | BZ | Bepper output (from microprocessor) |
| | 7 | A2 | AF output (from AF VOL) |
| | 8 | A1 | AF output (from electronic VOL) |
| | 9 | AE | GND |
| | 10 | TO | Tone output (from ladder resister network IC IC203) |
| | 11 | ME | MIC GND |
| | 12 | MIC | MIC output |
| | 13 | SCV | Busy control output (from IC11 KCD04) |
| CN6 | 1 | ES3 | Shift register enable |
| | 2 | ES2 | Shift register enable (from microprocessor) |
| | 3 | ES1 | Shift register enable (from microprocessor) |
| | 4 | EP1 | 144MHz shift register enable (to 144MHz PLL) |
| | 5 | EP4 | 430MHz shift register enable (to 430MHz PLL) |
| | 6 | CK | PLL clock |
| | 7 | DT | PLL data |
| | 8 | DET | DETECTOR OUT for CTCSS |
| | 9 | RD | Audio output (from IC3 KCD04) |
| | 10 | SCU | Busy control output (from IC3 KCD04) |
| | 11 | SQ | Squelch output (from IC3 KCD04) |
| | 12 | SMU | S-meter output (from IC3 KCD04) |
| | 13 | SMV | S-meter output (from IC11 KCD04) |
| W1 | 1 | E | GND |
| | 2 | RA1 | 144MHz receive ANT input |
| M2 | 1 | DO1 B | 144MHz transmit drive output |
| | 2 | DB | GND |
| | 3 | E | Drive + B |
| | 4 | B | GND |
| | 5 | | 13.8V |
| CONTROL UNIT (X57-3680-XX) (B/4) | | | |
| CN201 | 1 | E B | GND |
| | 2 | | + 13.8V (to power switch) |
| | 3 | PSW | Power switch control output (from microprocessor IC) |
| | 4 | SB | SWICHERD B |
| | 5 | 8C | Common +8V |
| | 6 | BZ | Bepper output (from microprocessor P20) |
| | 7 | A2 | Audio output (from electronic VOL) |
| | 8 | A1 | Audio input (from electronic VOL) |
| | 9 | AE | GND (AF VOL) |
| | 10 | TO | Tone output (from ladder register network IC203) |
| | 11 | ME | MIC GND |
| | 12 | MIC | MIC output (from mic jack) |
| | 13 | SCV | Busycorl output (from IC11 KCD04) |
| CN202 | 1 | ES3 | Shift register enable output |
| | 2 | ES2 | Shift register enable output |
| | 3 | ES1 | Shift register enable output |
| | 4 | EP1 | 144MHz PLL enable output |
| | 5 | EP4 | 430MHz PLL enable output |
| | 6 | CK | PLL clock |
| | 7 | DT | PLL data |
| | 8 | DE | Detector output for CTSSS |
| | 9 | RD | Audio output (to microprocessor INT0) |
| | 10 | SCU | Busy control output (to microprocessor P130) |
| | 11 | SQ | Squelch output |
| | 12 | SMU | S-meter output (to microprocessor PTH03) |
| | 13 | SMV | S-meter output (to microprocessor PTH02) |

| Connector No. | Terminal No. | Terminal No. | Terminal Functions |
|---|--------------|---------------------------------|--|
| TX-RX UNIT (X57-3680-XX) (A4) | | | |
| CN203 | 1 | CE | LCD driver enable output (from microprocessor P33) |
| | 2 | DT | LCD driver data (from microprocessor P140) |
| CN204 | 3 | CK | LCD driver clock (from microprocessor P141) |
| | 1 | OE | EN DTMF enable output |
| | 2 | STBY | NC |
| | 3 | ACL | CE DTMF decoder CE |
| | 4 | WR | DTSEL |
| | 5 | RD | |
| | 6 | VOA | |
| | 7 | VOB | |
| | 8 | DV | |
| | 9 | 5C | |
| | 10 | DST | DTMF detected signal input +5V |
| CN205 | 1 | DT | LCD driver DATA output |
| | 2 | CK | LCD driver clock output |
| | 3 | CE | LCD driver enable output |
| | 4 | 5C | + 5V |
| | 5 | E | GND |
| | 6 | FC | Function Control |
| | 7 | NC | |
| | 8 | F,LAMP | Function lamp B |
| | 9 | LAMP | Lamp B |
| W201 | 1 | ET | CTCSS unit enable output (from microprocessor P73) |
| | 2 | DT | CTCSS unit data output (from microprocessor P22) |
| | 3 | CT | CTCSS unit clock output (from microprocessor P21) |
| | 4 | SDD | CTCSS tone matching input |
| | 5 | 5C | |
| | 6 | RD | Audio demodulation output (to CTCSS unit) |
| | 7 | E | GND |
| 144 FINAL UNIT (X57-3680-XX) (C/4) | | | |
| CN301 | 1 | D01 | 144MHz transmit drive output |
| | 2 | E | GND |
| | 3 | DB | Transmit drive stage + B |
| | 4 | E | GND |
| | 5 | B | 13.8V |
| CN302 | 1 | E | GND |
| | 2 | PA1 | 144MHz receiver ANT input |
| | | + B | 13.8V (from fuse holder) |
| | | E | GND |
| 430FINAL UNIT (X57-3680-XX) (D/4) | | | |
| CN401 | 1 | SP | Speaker output (to speaker) |
| | 2 | E | GND |
| CN402 | 1 | FB | + 13.8V |
| | 2 | FB | + 13.8V |
| | 3 | DB | Module transmit drive stage + B |
| | 4 | DB | Module transmit drive stage + B |
| | 5 | E | GND |
| | 6 | AP | AP output (to EXT SP jack) |
| CN403 | 1 | 8T1 | + 8V in transmit mode (430MHz) |
| | 2 | PRO | Protection input (from final unit) |
| | 3 | E | GND |
| | 4 | PRO | Protection input |
| | 5 | PC | APC input |
| | 6 | 8T4 | + 8V in transmit mode (430MHz) |
| CN404 | 1 | 8T1 | + 8V in transmit mode (144MHz) |
| | 2 | PRO | (to 144final unit) |
| | 3 | E | Protection input (from dinal unit) |
| | 4 | PC | GND |
| | | APC input (from 144 final unit) | |
| J401 | | | EXT. SP jack |
| TP401 | | ANT2 | ANT connector |
| | | E | GND |
| W401 | | DO4 | 430MHz drive output |
| | | E | GND |
| W402 | | RA4 | 430MHz receive ANT output |
| | | E | GND |
| W302 | | +B | +13.8V |

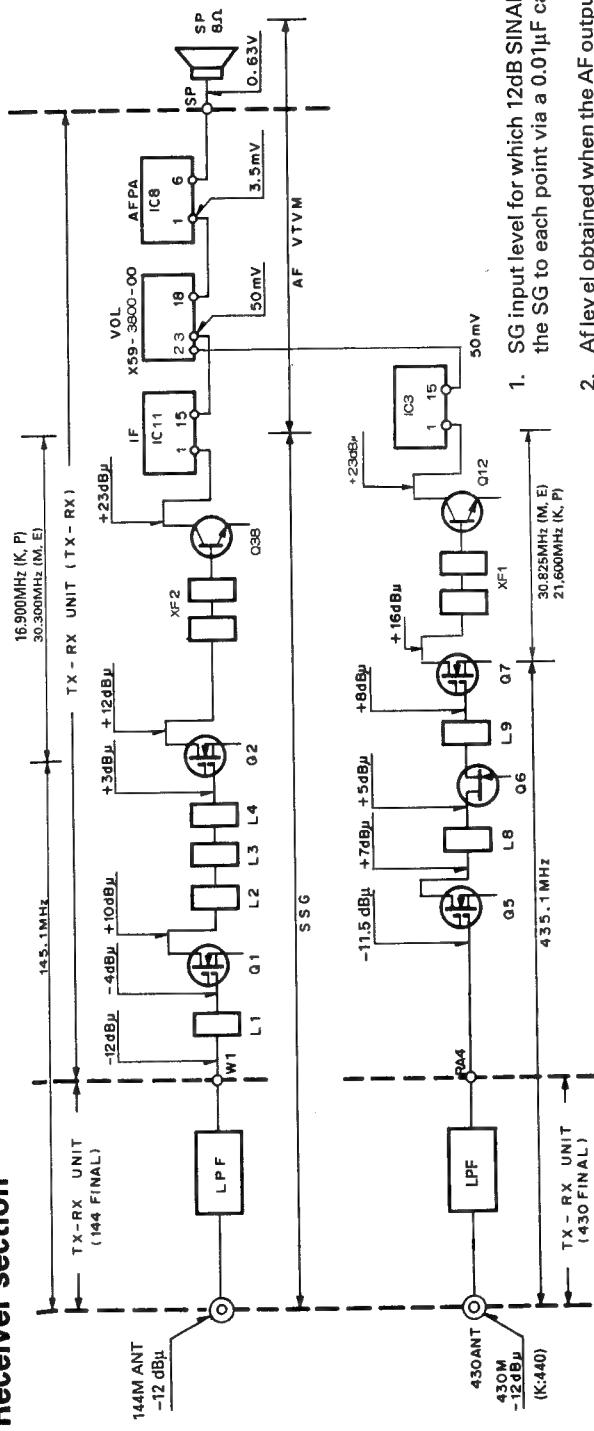


BLOCK DIAGRAM



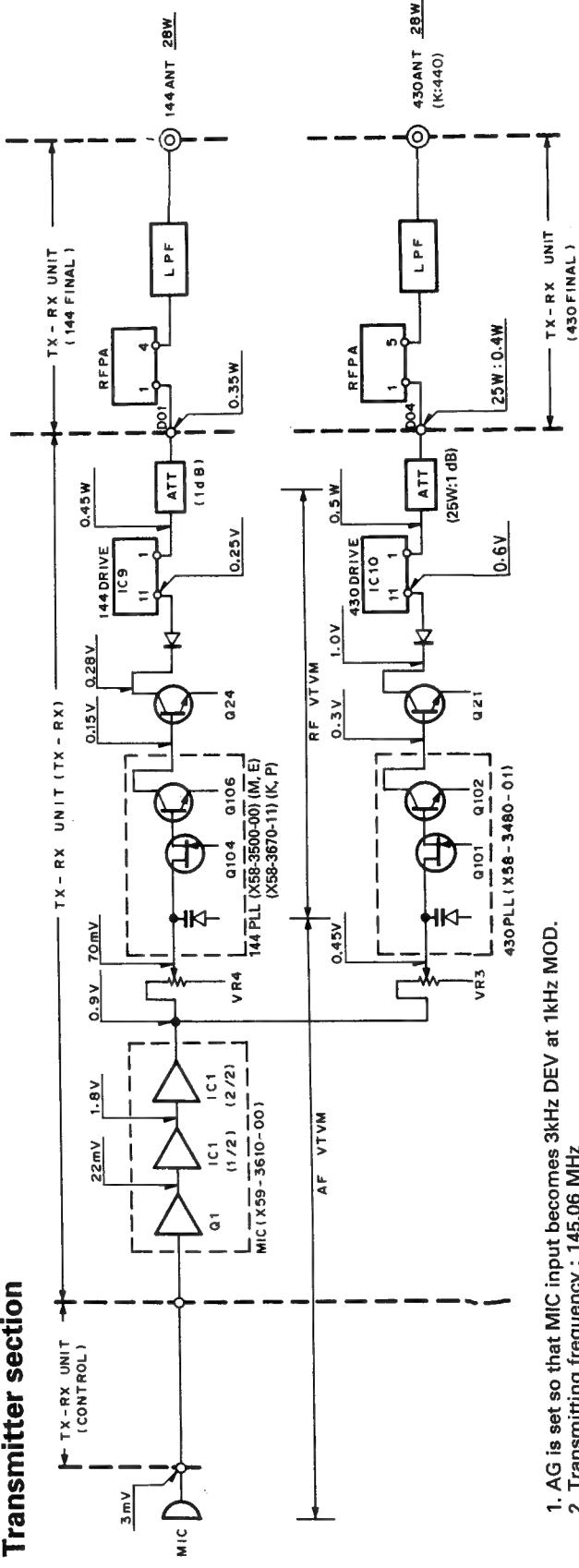
LEVEL DIAGRAM

Receiver section



front panel AF VOL control. Measured with an Voltmeter connected to the external speaker jack, receiving a 40dB EMF SSG signal modulated at 1kHz. DEV 3kHz.

Transmitter section

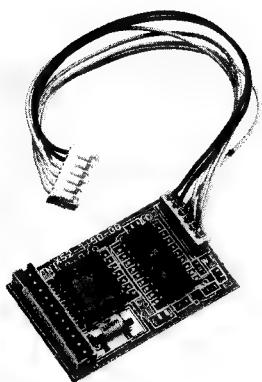


1. AG is set so that MIC input becomes 3kHz DEV at 1kHz MOD.
2. Transmitting frequency : 145.06 MHz

TM-702A/E

DTU-2 (DTMF UNIT)

DTU-2 EXTERNAL VIEW



DUT-2 PARTS LIST

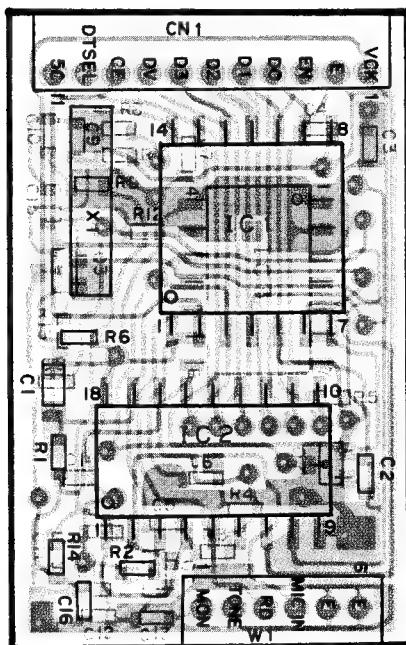
* NEW PARTS

| Ref. No. | New parts | Parts No. | Description | | |
|----------|-----------|---------------|-----------------------------|----------------|---|
| C1 | | CK73FB1E104K | Chip C | 0.1 μ F | K |
| C2 | | CC73GCH1H100D | Chip C | 10pF | D |
| C3, 4 | | CC73GCH1H330J | Chip C | 33pF | J |
| C5~8, 10 | | CK73GB1E103K | Chip C | 0.01 μ F | K |
| C13~16 | | CK73GB1E103K | Chip C | 0.01 μ F | K |
| C9 | | CK73GB1E822K | Chip C | 0.0082 μ F | K |
| C10 | | CK73GB1E322K | Chip C | 0.0033 μ F | K |
| C11 | | CC73GSL1H101J | Chip C | 100pF | J |
| | * | E37-0033-05 | Connecting cable (6P) | | |
| | * | E40-5188-05 | Pin ass'y socket (11P) | | |
| X1 | | L78-0061-05 | CERAMIC RESONATOR (3.58MHz) | | |
| R1~14 | | RK73GB1JxxxxJ | Chip R | | |
| Q1 | | DTC114EU | Digital transistor | | |
| Q2, 3 | | 2SC4116 (Y) | Digital transistor | | |
| IC1 | | TP5088WM | IC | | |
| IC2 | * | LCT385M | IC | | |
| IC3 | * | BU4066BF | IC | | |

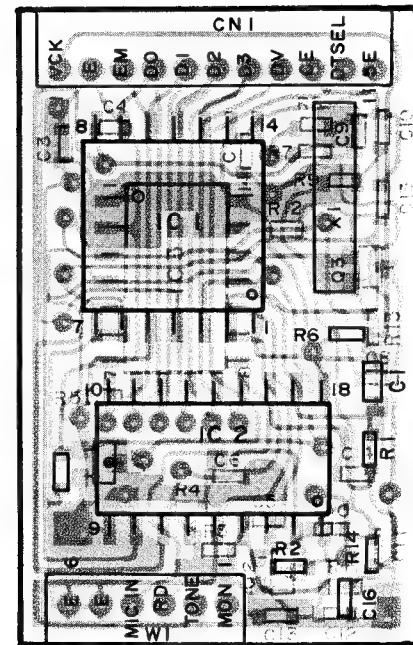
DTU-2 (DTMF UNIT)

DTU-2 PC BOARD VIEWS

Componet side view

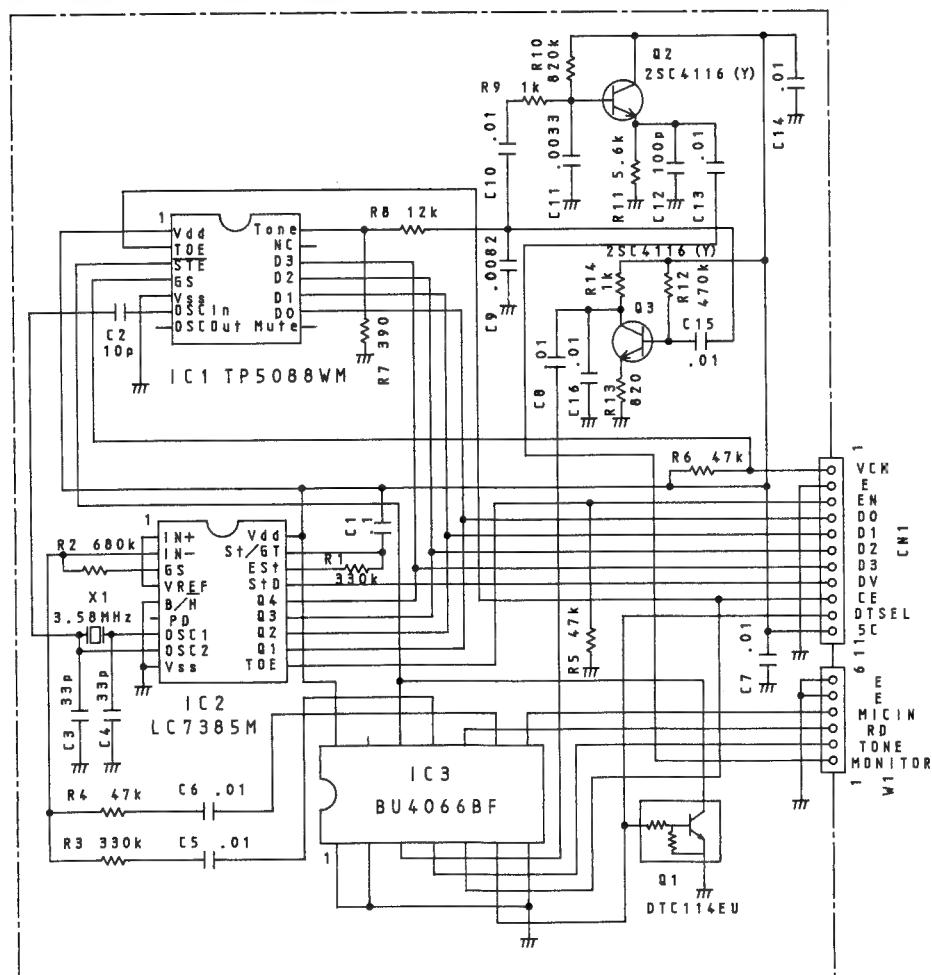


Foil side view



Component side
Foil side

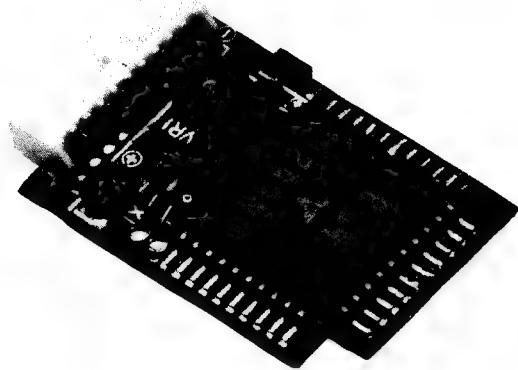
DTU-2 CIRCUIT DIAGRAM



TM-702A/E

TSU-6 (CTCSS UNIT)

TSU-6 EXTERNAL VIEW



TSU-6 PARTS LIST

* New parts

| Ref. No. | New Parts | Parts No. | Description |
|--------------------------|-----------|---------------|-----------------------------|
| CTCSS UNIT (X52-3100-00) | | | |
| C1 | | CK73FB1H102K | Chip C 1000pF K |
| C2 | | C92-0010-05 | Tantal 6.8μF 6.3WV |
| C3 | * | C92-0006-05 | Tantal 3.3μF 4.0WV |
| C4, 5 | | CK73EB1E104K | Chip C 0.1μF K |
| C6 | | CK73EB1H223K | Chip C 0.022μF K |
| C7 | | CK73EB1E104K | Chip C 0.1μF K |
| C8, 9 | | CC73FCH1H150J | Chip C 15pF J |
| C10 | | CC73EB1H102K | Chip C 1000pF K |
| C11 | | CK73EB1E104K | Chip C 0.1μF K |
| C12 | | C92-0507-05 | Chip tan. 4.7μF 6.3WV |
| C13 | * | C92-0510-05 | Chip tan. 3.3μF 4.0WV |
| | * | E40-5121-05 | Pin connector (10P) |
| X1 | | L77-1313-05 | X'tal resonator 4.194304MHz |
| R1-10 | | RK73FB2 000J | Chip resistor |
| R12-14 | | RK73FB2 000J | Chip resistor |
| VR1 | * | R12-3460-05 | Trimming pot. 33kΩ |
| Q1 | | DTC144TK | Digital transistor |
| Q2 | | DTA114EK | Digital transistor |
| Q3 | | 2SC2712(GR) | Chip transistor |
| IC1 | | MN6520 | IC |
| IC2 | | MN4094BS | IC |

TSU-6 FINE ADJUSTMENT OF TONE FREQUENCY

The tone frequency can be fine adjusted with an interval of 0.5% step over the range of 0 to + 1.5%. Ground the T1 (pin 10) and T2 (pin 9) of IC1 to obtain the desired frequency.

| | T1 | T2 |
|-------|----|----|
| 0% | x | x |
| +0.5% | ○ | x |
| +1.0% | x | ○ |
| +1.5% | ○ | ○ |

○ : GND, x : OPEN

Table 3

TSU-6 REFERENCE DATA

TH-25's condition and MN4094BS (IC2) relationship

| Ref. No switch | Tone switch | TX/RX | MN4094BS terminal | | |
|-------------------|----------------|-------|-------------------|----|--------------|
| | | | Q5 | Q6 | Q1 ~ 4, 7, 8 |
| OFF | OFF | TX | L | H | L |
| | | RX | L | H | L |
| | ON | TX | L | L | See table 2 |
| | | RX | L | H | L |
| ON | OFF | TX | L | L | See table 2 |
| | | RX | H | L | |
| | On | TX | L | L | |
| | | RX | H | L | |

Q1 ~ 4, 7, 8 : Tone frequency setting

Q5 : TX/RX switch for MN6520 (IC1). "H" : RX, "L" : TX.

Q6 : Power switch for MN6520 (IC1). "H" : OFF, "L" : ON.

Table 1

Tone frequency and MN6520 (IC1) relationship

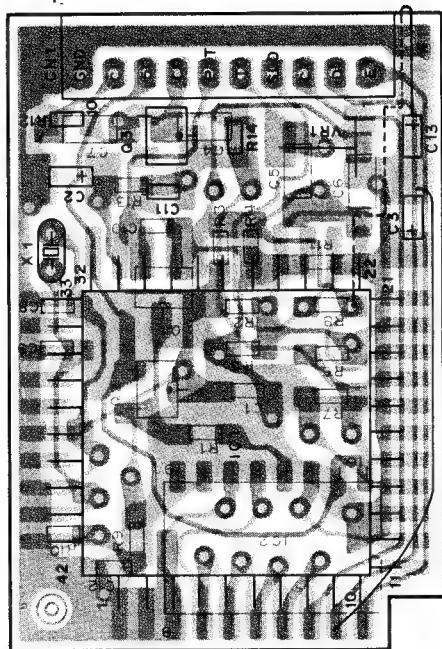
| Tone frequency (Hz) | MN6520 terminal | | | | | |
|---------------------------|-------------------|----|----|----|----|----|
| | MN4094BS terminal | | | | | |
| | Q1 | Q2 | Q3 | Q4 | Q7 | Q8 |
| 67.0 | L | H | H | H | L | H |
| 71.9 | L | H | H | H | L | L |
| 74.4 | L | H | H | L | H | H |
| 77.0 | L | H | H | L | H | L |
| 79.7 | L | H | H | L | L | H |
| 82.5 | L | H | H | L | L | L |
| 85.4 | L | H | L | H | H | H |
| 88.5 | L | H | L | H | H | L |
| 91.5 | L | H | L | H | L | H |
| 94.8 | H | H | H | L | L | H |
| 100.0 | H | H | H | L | L | L |
| 103.5 | H | H | L | H | H | H |
| 107.2 | H | H | L | H | H | L |
| 110.9 | H | H | L | H | L | H |
| 114.8 | H | H | L | H | L | L |
| 118.8 | H | H | L | L | H | H |
| 123.0 | H | H | L | L | H | L |
| 127.3 | H | H | L | L | L | H |
| 131.8 | H | H | L | L | L | L |
| 136.5 | H | L | H | H | H | H |
| 141.3 | H | L | H | H | H | L |
| 146.2 | H | L | H | H | L | H |
| 151.4 | H | L | H | H | L | L |
| 156.7 | H | L | H | L | H | H |
| 162.2 | H | L | H | L | H | L |
| 167.9 | H | L | H | L | L | H |
| 173.8 | H | L | H | L | L | L |
| 179.9 | H | L | L | H | H | H |
| 186.2 | H | L | L | H | H | L |
| 192.8 | H | L | L | H | L | H |
| 203.5 | H | L | L | H | L | L |
| 210.7 | H | L | L | L | H | H |
| 218.1 | H | L | L | L | H | L |
| 225.7 | H | L | L | L | L | H |
| 233.6 | H | L | L | L | L | L |
| 241.8 | L | H | H | H | H | H |
| 250.3 | L | H | H | H | H | L |

Table 2

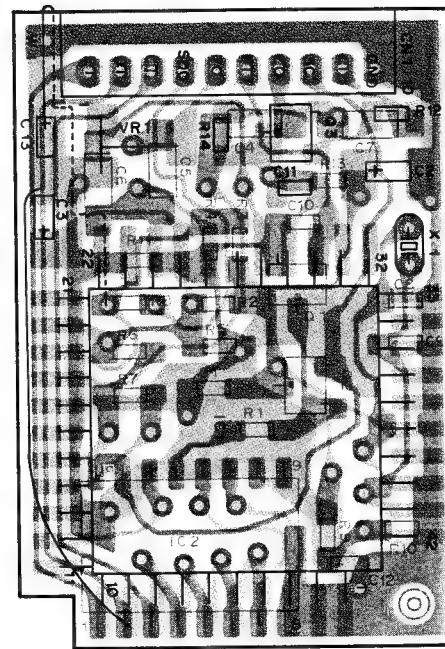
TSU-6 (CTCSS UNIT)

TSU-6 PC BOARD VIEWS

Component side view



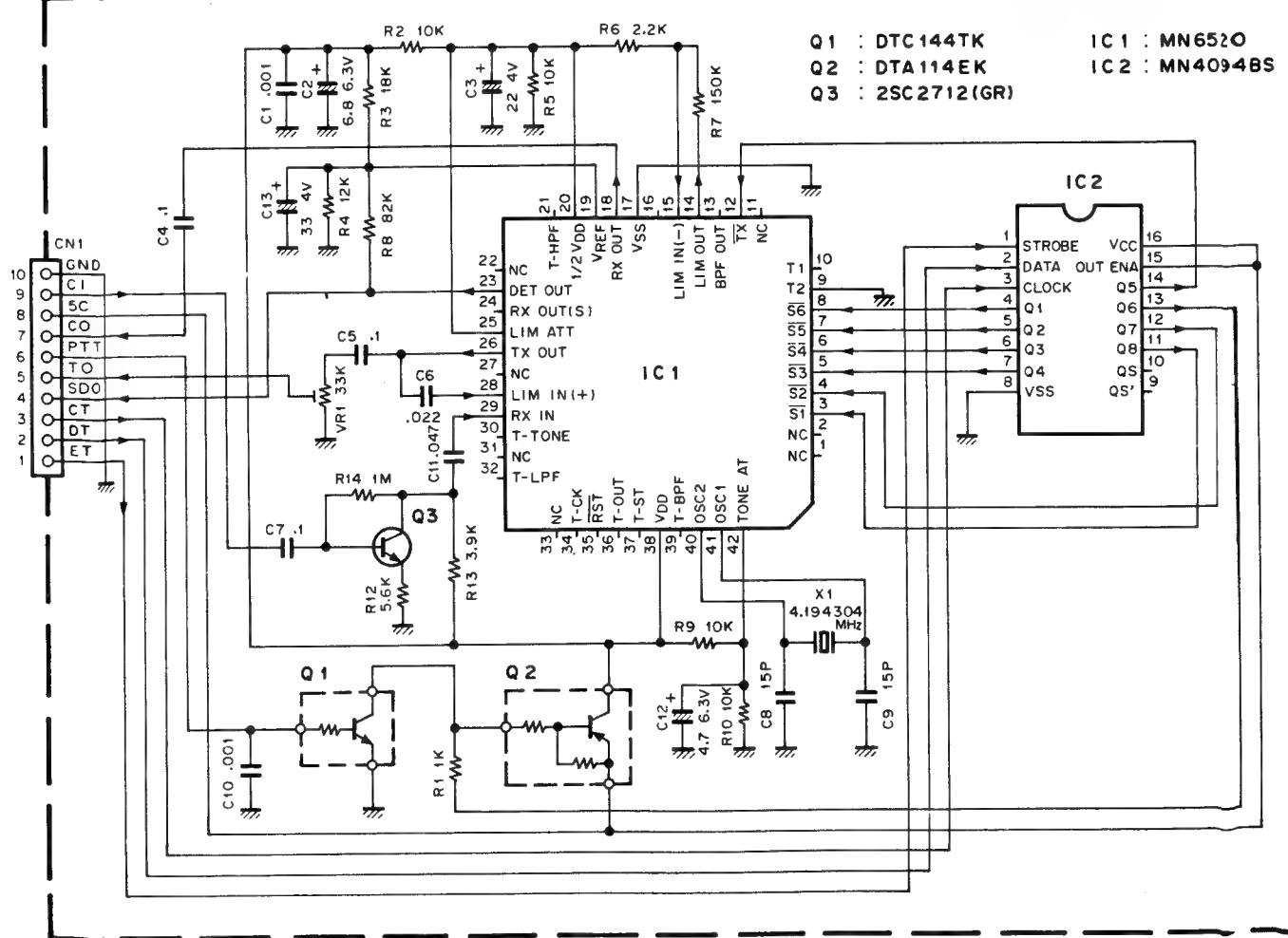
Foil side view



■ : Component side

■ : Foil side

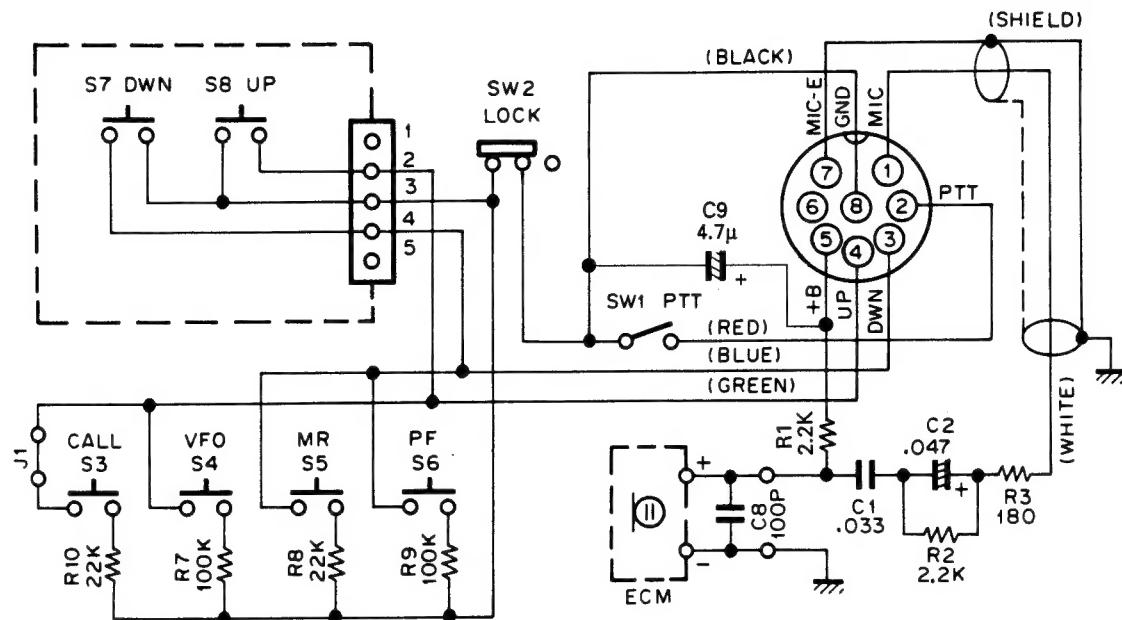
TSU-6 CIRCUIT DIAGRAM CTCSS UNIT (X52-3100-00)



TM-702A/E

MC-44 (MULTI FUNCTION MICPOHONE)

MC-4 SCHEMATIC DIAGRAM



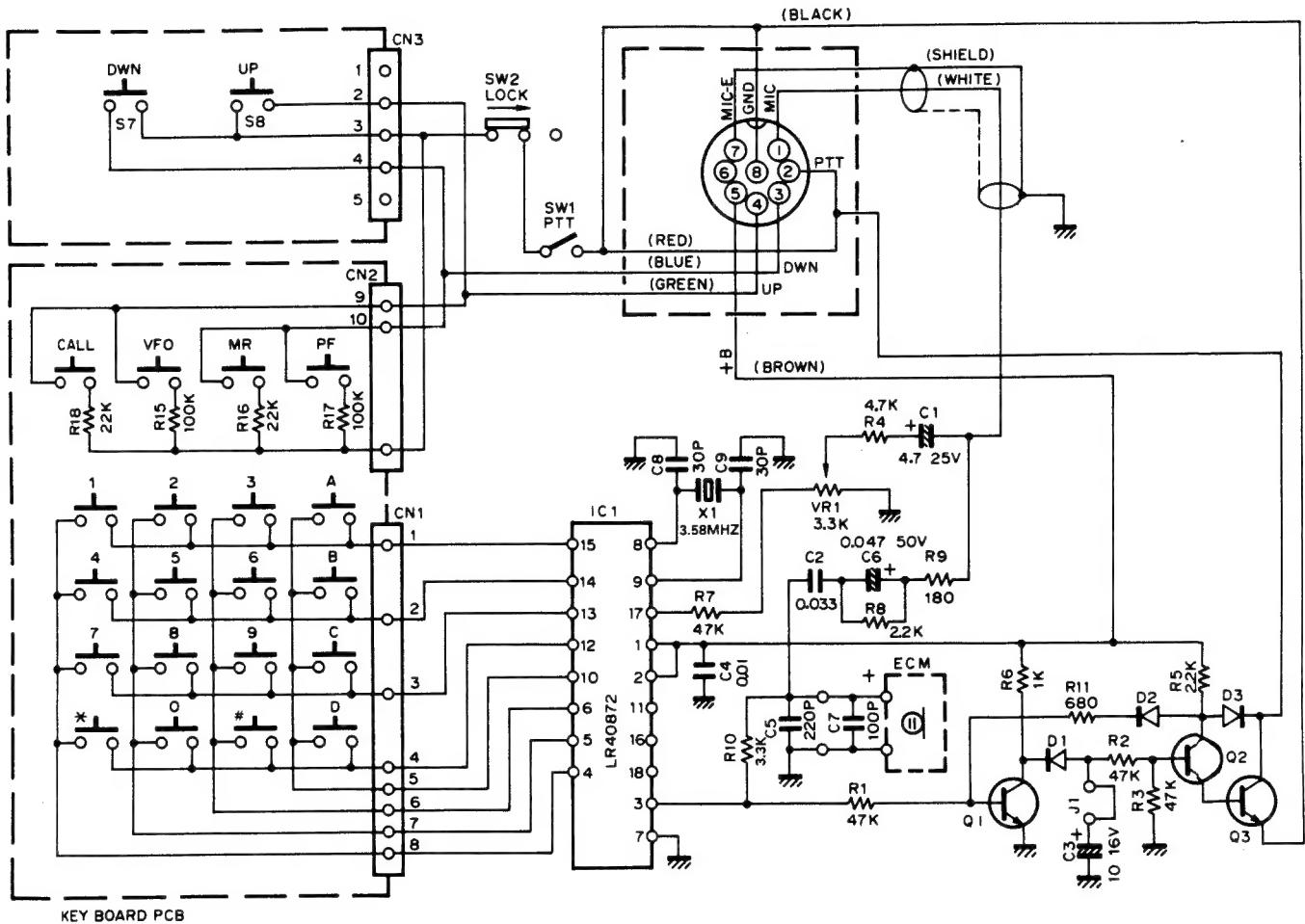
MC-44 PARTS LIST

| Ref. No. | New parts | Parts No. | Description |
|----------|-----------|---|--|
| | * | A02-0896-18 A02-0900-08 | Case (Front) Case (Rear) |
| | * | B50-8293-18 | Instruction manual |
| | * | E30-2149-08 E13-0933-08 K29-3156-08 | Curt cord Cushion Knob |
| | * | K29-3168-18 | Knob |
| | * | K29-3169-18 | Knob |
| | | K29-3170-08 | Knob |
| SW2 | | S31-1422-08 | Slide switch LOCK |
| SW1 | | S50-1431-08 | Micro switch PTT |
| S7, 8 | * | S59-1409-28 T91-0383-08 | Switch Ass'y UP, DOWN Microphone element (Condenser microphone) |

MC-44DM/44DEM

(MULTI FUNCTION MICROPHONE WITH AUTOPATCH)

MC-44DM/MC-44DME SCHEMATIC DIAGRAM



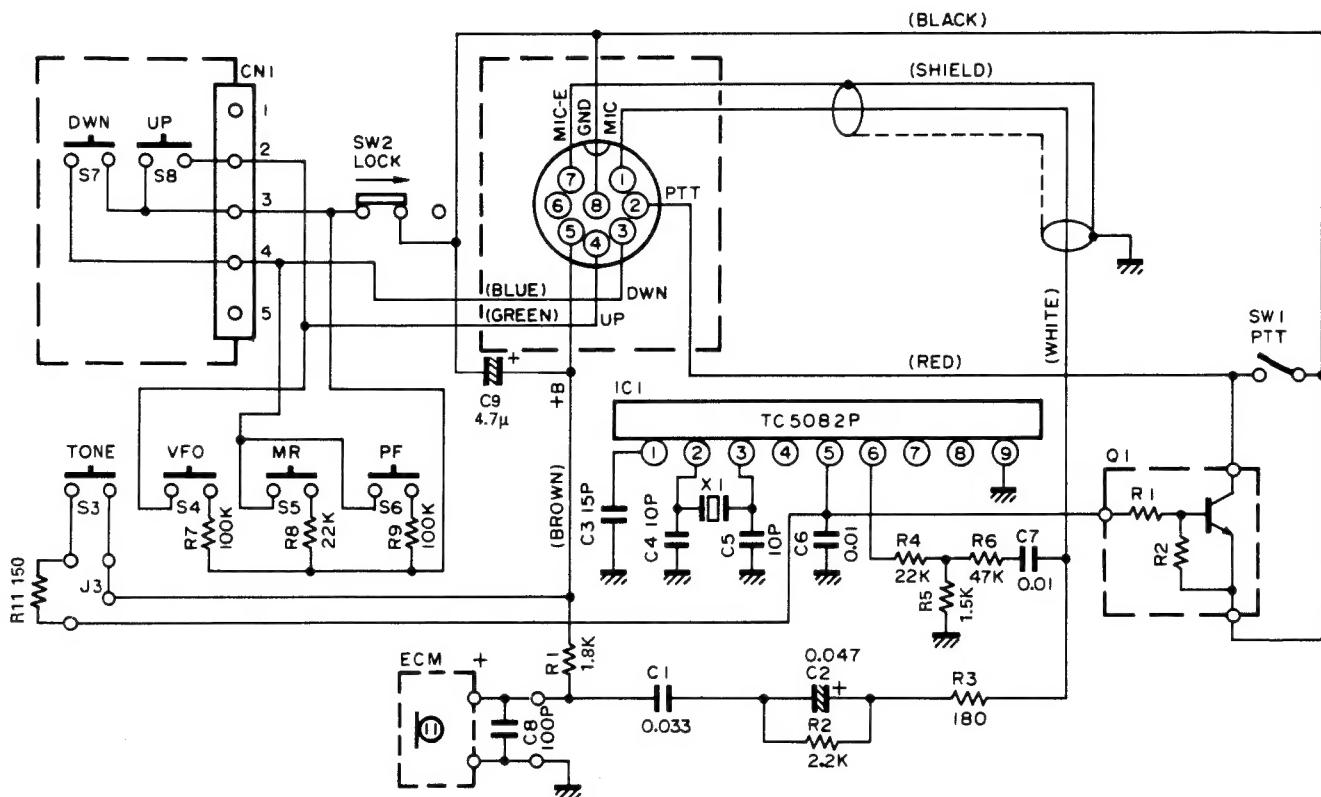
MC-44DM/MC-44DME PARTS LIST

| Ref. No. | New parts | Parts No. | Description | | |
|---------------------|-----------|-------------|---|------------------|---|
| SW2 SW1 S7, 8 | * | A02-0898-18 | Case (Front) | DTMF | M |
| | * | A20-0899-18 | Case (Front) | DTMF (With TONE) | E |
| | | A02-0901-08 | Case (Rear) | DTMF | |
| | * | B50-8293-18 | Instruction manual | | |
| | | E30-2149-08 | Curt cord | | |
| | * | E13-0933-08 | Cushion | | |
| | | K29-3165-08 | Knob | PTT | |
| | | K29-3167-08 | Key top | DTMF | |
| | * | K29-3168-18 | Knob | UP | |
| | * | K29-3169-18 | Knob | DOWN | |
| SW2 SW1 S7, 8 | | S31-1422-08 | Slide switch | LOCK | |
| | | S50-1431-08 | Micro switch | PTT | |
| | * | S59-1409-28 | Switch Ass'y | UP, DOWN | |
| | | T91-0383-08 | Microphone element (Condenser microphone) | | |

TM-702A/E

MC-44E (MULTI FUNCTION MICROPHONE)

MC-44E SCHEMATIC DIAGRAM



MC-44E PARTS LIST

| Ref. No. | New parts | Parts No. | Description | |
|----------|-----------|----------------------------|---|--------------------|
| | * | A02-0897-18 A02-0900-08 | Case (Front) Case (Rear) | With TONE |
| | * | B50-8293-18 | | Instruction manual |
| | * | E30-2149-08 | Curt cord | |
| | * | G13-0933-08 | Cushion | |
| | * | K29-3165-08 | Knob | PTT |
| | * | K29-3168-18 | Knob | UP |
| | * | K29-3169-18 | Knob | DOWN |
| | * | K29-3170-08 | Knob | 1750, VFO, MR, PF |
| SW2 | | S31-1422-08 | Slide switch | LOCK |
| SW1 | | S50-1431-08 | Micro switch | PTT |
| S7, 8 | * | S59-1409-28 | Switch Ass'y | UP, DOWN |
| | * | T91-0383-08 | Microphone element (Condenser microphone) | |

TM-702A/E

SPECIFICATIONS

| | | TM-702A | | TM-702E | | |
|-------------|--|--|--|---------------------------------------|--|--|
| GENERAL | Frequency range (MHz) | 144 to 148 / 438 to 450 K. P TYPE | 144 to 148 / 430 to 440 M. M2 TYPE | 144 to 146 / 430 to 440 E. E2 TYPE | | |
| | Mode | F3E (FM) | | | | |
| | Antenna impedance | 50Ω | | | | |
| | Operating temperature | -20°C to +60°C (-4°F to +140°F) | | | | |
| | Power requirements | 13.8VDC ±15% (11.7 to 15.8V) | | | | |
| | Ground | Negative | | | | |
| | Current drain | Transmit mode | Less than 8A | | | |
| | | Receiver mode | Less than 0.6A | | | |
| | Frequency stability | less than ±10ppm | | | | |
| TRANSMITTER | Dimensions (W × H × D) (Projections included) | 140(5-1/2") × 40(1-37/64") × 200(7-7/8") (141(5-9/16") × 42(1-21/32") × 212(8-11/32") | | | | |
| | Weight | 1.4kg (3.11lbs) | | | | |
| | output power* | HI | 25W | | | |
| | | MID | 10W | | | |
| | | LOW | Approx. 2W | | | |
| | Modulation | Reactance modulation | | | | |
| | Spurious radiation | Less than -60dB | | | | |
| | Maximum frequency deviation | ±5kHz | | | | |
| | Audio distortion (at 60% modulation) | Less than 3% (300 to 3000 Hz) | | | | |
| RECEIVER | Microphone impedance | 500 to 600Ω | | | | |
| | Circuitry | Double conversion superheterodyne | | | | |
| | Intermediate frequency 1st/2nd | 144MHz : 16.9MHz/455kHz 440MHz : 21.6MHz/455kHz | 144MHz : 30.3MHz/455kHz 430MHz : 30.825MHz/455kHz | | | |
| | Sensitivity (12dB SINAD) | Less than 0.16µV | | | | |
| | Selectivity | -6dB : More than 12kHz, -60dB : Less than 24kHz | | | | |
| | Squelch sensitivity | Less than 0.1µV | | | | |
| | Output (5% distortion) | More than 2W across 8Ω load (5% distortion) | | | | |
| | External speaker impedance | 8Ω | | | | |

Notes : 1. Circuit and ratings are subject to change without notice due to advancement in technology.
 2. *Recommended duty cycle : 1 minute ; Transmission, 3 minutes, Reception

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